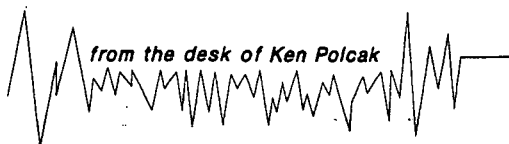




MARYLAND DEPARTMENT OF TRANSPORTATION

OFFICE OF ENVIRONMENTAL DESIGN



MARYLAND DEPARTMENT of the ENVIRONMENT

STANLEY TSAI

ADMINISTRATOR III

ENVIRONMENTAL PERMITS SERVICE CENTER

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Lin, I-Chun

Environmental Technician


Bureau Of Air Quality Protection And Noise Control

Need to pull together
Policy package related to
land use controls / local ordinances
& SHA assistance.


**MARYLAND
MUNICIPAL
LEAGUE**
The Association of Cities and Towns

CANDACE L. DONOHO
Manager
Governmental Relations

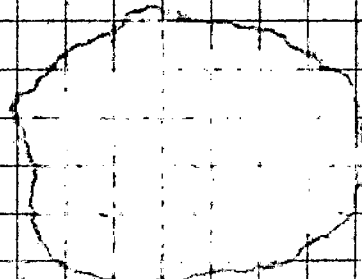
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**Maryland
Association
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169 Conduit Street
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ERIN P. DOUGHERTY
Associate Director

Following to Interagency
Noise Committee mtg
on 4/15/02



Regulatory Changes Relating to Gun Clubs

The new regulations will be as follows:

Title 26 DEPARTMENT OF THE ENVIRONMENT Subtitle 02 OCCUPATIONAL, INDUSTRIAL, AND RESIDENTIAL HAZARDS

Chapter 03 Control of Noise Pollution

Authority: Environment Article, § 3-401, Annotated Code of Maryland

26.02.03.03

B. Exemptions.

- (1) The provisions of this regulation may not apply to devices used solely for the purpose of warning, protecting, or alerting the public, or some segment thereof, of the existence of an emergency situation.
- (2) The provisions of this regulation do not apply to the following:
 - (a) Household tools and portable appliances in normal usage.
 - (b) Lawn care and snow removal equipment (daytime only) when used and maintained in accordance with the manufacturer's specifications.
 - (c) Agricultural field machinery when used and maintained in accordance with manufacturer's specifications.
 - (d) Blasting operations for demolition, construction, and mining or quarrying (daytime only).
 - (e) Motor vehicles on public roads.
 - (f) Aircraft and related airport operations at airports licensed by the State Aviation Administration.
 - (g) Boats on State waters or motor vehicles on State lands under the jurisdiction of the Department of Natural Resources.
 - (h) Emergency operations.
 - (i) Pile driving equipment during the daytime hours of 8 a.m. to 5 p.m.
 - (j) ~~[Sound not electronically amplified created by sporting, amusement, and entertainment events and other public gatherings operating according to terms and conditions of the appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facilities, parades, and public celebrations. This exemption only applies between the hours of 7 a.m. and 12 midnight.]~~

SOUND, EXCEPT THOSE SOUNDS THAT ARE ELECTRONICALLY AMPLIFIED, CREATED BY SPORTING EVENTS (EXCEPT TRAP SHOOTING, SKEET SHOOTING, OR OTHER TARGET SHOOTING), ENTERTAINMENT EVENTS AND OTHER PUBLIC GATHERINGS OPERATING UNDER PERMIT OR PERMISSION OF THE APPROPRIATE LOCAL JURISDICTION. THIS INCLUDES BUT IS NOT LIMITED TO ATHLETIC CONTESTS, AMUSEMENT PARKS, CARNIVALS,

FAIRGROUNDS, SANCTIONED AUTO RACING FACILITIES, PARADES, AND PUBLIC CELEBRATIONS. THIS EXEMPTION ONLY APPLIES BETWEEN THE HOURS OF 7 AM AND MIDNIGHT.

(k) Rapid rail transit vehicles and railroads.

(l) Construction and repair work on public property.

(m) Air conditioning or heat pump equipment used to cool or heat housing on residential property. For this equipment, a person may not cause or permit noise levels, which exceed 70 dBA for air conditioning equipment at receiving residential property and 75 dBA for heat pump equipment at receiving residential property.

(N) TRAP SHOOTING, SKEET SHOOTING, OR OTHER TARGET SHOOTING BETWEEN THE HOURS OF 9 AM AND 10 PM ON ANY RANGE OR OTHER PROPERTY OF A SHOOTING SPORTS CLUB THAT IS CHARTERED AND IN OPERATION AS OF JANUARY 1, 2001. THIS EXEMPTION DOES NOT APPLY IN ALLEGANY, ANNE ARUNDEL, BALTIMORE CITY, CALVERT, CHARLES, GARRETT, HOWARD, MONTGOMERY, ST. MARY'S AND WASHINGTON COUNTIES.

Alternate (positive listing of counties for which the exemption applies)

(N) TRAP SHOOTING, SKEET SHOOTING, OR OTHER TARGET SHOOTING BETWEEN THE HOURS OF 9 AM AND 10 PM ON ANY RANGE OR OTHER PROPERTY OF A SHOOTING SPORTS CLUB THAT IS CHARTERED AND IN OPERATION AS OF JANUARY 1, 2001. THIS EXEMPTION APPLIES ONLY IN BALTIMORE, CAROLINE, CARROLL, CECIL, DORCHESTER, FREDERICK, HARFORD, KENT, PRINCE GEORGES, QUEEN ANNES, SOMERSET, TALBOT, WICOMICO, AND WORCESTER COUNTIES.

5

Statutory Changes Regarding Council Roles

§3-205 Advisory role of Council.

(a) Duty of the Department – Before the Department PROPOSES ANY CHANGES IN THE GOVERNING STATUTE OR ~~adopts any~~ REVISIONS TO THE environmental noise REGULATIONS ~~standard or sound level limit~~, the Department shall submit the proposed REVISIONS ~~environmental noise standard or sound level limit~~ to the Council for advice. THE DEPARTMENT SHALL ASSIST THE COUNCIL BY ARRANGING FOR:

1. HEARINGS OR PRESENTATIONS BY PUBLIC AND OR BUSINESS INTERESTS, AND
2. PREPARE OR SOLICIT TECHNICAL INPUT OR PRESENTATIONS ON ISSUES.

(b) Duty of the Council – Within 60 days after receiving a proposed REVISION ~~environmental noise standard or sound level limit~~ from the Department, the Council shall give the Department its advice on the proposal by recommending:

1. Adoption
2. Rejection; or
3. Modification.

THE COUNCIL MAY ALSO PROVIDE GENERAL ADVICE TO THE DEPARTMENT ON ANY MATTER RELATING TO NOISE POLLUTION.

Statutory Changes for HVAC Standards

Subtitle 4. Rulemaking and Enforcement

§ 3-401. Environmental noise standards, sound level limits, and noise control rules and regulations - Adoption

(a) Except as otherwise provided by law, the Department shall adopt environmental noise standards, sound level limits, and noise control rules and regulations as necessary to protect the public health, the general welfare, and property.

(b) In adopting environmental noise standards, the Department shall consider:

- (1) Information published by the Administrator of the United States Environmental Protection Agency on the levels of environmental noise that must be attained and maintained in defined areas under various conditions to protect public health and welfare with an adequate margin of safety; and
- (2) Scientific information about the volume, frequency, duration, and other characteristics of noise that may harm public health, safety, or general welfare, including:

- (i) Temporary or permanent hearing loss;
- (ii) Interference with sleep, speech communication, work, or other human activities;
- (iii) Adverse physiological responses;
- (iv) Psychological distress;
- (v) Harm to animal life;
- (vi) Devaluation of or damage to property; and
- (vii) Unreasonable interference with the enjoyment of life or property.

(c) (1) In adopting sound level limits and noise control rules and regulations, the Department shall consider, among other things:

- (i) The residential, commercial, or industrial nature of the area affected;
- (ii) Zoning;
- (iii) The nature and source of various kinds of noise;
- (iv) The degree of noise reduction that may be attained and maintained using the best available technology;
- (v) Accepted scientific and professional methods for measurement of sound levels; and
- (vi) The cost of compliance with the sound level limits.

(2) The sound level limits adopted under this subsection shall be consistent with the environmental noise standards adopted by the Department.

(3) The sound level limits and noise control rules and regulations adopted under this subsection may not prohibit trapshooting or other target shooting on any range or other property in Frederick County that the Frederick County Department of Planning and Zoning has approved as a place for those sporting events.

(4) REPEAL AND RESERVE

~~{ The sound level limits and noise control rules and regulations adopted under this subsection shall be as follows for residential heat pumps and air conditioning units:~~

~~(i) Residential heat pumps 75dba.~~

~~(ii) Residential air conditioning units 70dba. }~~

1

Statutory Changes for Council Membership

Subtitle 2. Environmental Noise Advisory Council

§ 3-201. Council Established

There is an Environmental Noise Advisory Council in the Department.

§ 3-202. Membership

(a) (1) The Council consists of **[5] ELEVEN** members, **NINE VOTING MEMBERS** appointed by the Secretary **AND TWO EX OFFICIO MEMBERS**.

(2) Of the **[5] ELEVEN** Council members:

(i) 1 shall be appointed from a list of at least 3 qualified individuals submitted to the Secretary by the Acoustical Society of America AND THE INSTITUTE OF NOISE CONTROL ENGINEERING;

(ii) 1 shall be a physician who specializes in hearing, appointed from a list of at least 3 qualified individuals submitted to the Secretary by the Medical and Chirurgical Faculty of the State of Maryland;

(iii) 1 shall be appointed from a list of at least 3 qualified individuals submitted to the Secretary by the Chancellor of the University System of Maryland; and

(iv) 2 shall be appointed from the **[general]** public AT LARGE.

(V) 1 SHALL BE APPOINTED FROM A LIST OF AT LEAST 3 ~~QUALIFIED~~ INDIVIDUALS SUBMITTED TO THE SECRETARY BY THE MARYLAND MUNICIPAL LEAGUE;

(VI) 1 SHALL BE APPOINTED FROM A LIST OF AT LEAST 3 ~~QUALIFIED~~ INDIVIDUALS SUBMITTED TO THE SECRETARY BY THE MARYLAND ASSOCIATION OF COUNTIES;

(VII) 2 SHALL BE APPOINTED FROM A LIST OF AT LEAST 3 ~~QUALIFIED~~ INDIVIDUALS SUBMITTED TO THE SECRETARY BY THE MARYLAND CHAMBER OF COMMERCE;

(VIII) 1 EX OFFICIO MEMBER SHALL BE APPOINTED FROM THE SENATE BY THE PRESIDENT OF THE SENATE; AND

(IX) 1 EX OFFICIO MEMBER SHALL BE APPOINTED FROM THE HOUSE OF DELEGATES BY THE SPEAKER OF THE HOUSE.

[(3) Before appointing the members from among the general public, the Secretary shall request and consider suggestions for nominees from:

(i) The Maryland State Chamber of Commerce;

(ii) The Maryland Transportation Federation;

(iii) The Maryland Environmental Trust; and

(iv) Any other environmental groups that the Secretary selects.]

[(4)] (3) In making any appointment to the Council, the Secretary shall consider giving appropriate representation to the various geographical areas of this State.

(b) Each member of the Council shall be a resident of this State.

8

(c) TENURE – EACH MEMBER SHALL BE APPOINTED FOR A TERM OF FIVE YEARS.

[(1) The term of a member is 5 years.

(2) The terms of members are staggered as required by the terms provided for members of the Council on July 1, 1982. The terms of those members end as follows:

- (i) 1 in 1983;**
- (ii) 1 in 1984;**
- (iii) 1 in 1985;**
- (iv) 1 in 1986; and**
- (v) 1 in 1987.**

(3) At the end of a term, a member continues to serve until a successor is appointed and qualifies.

(4) A member who is appointed after a term has begun serves only for the rest of the term and until a successor is appointed and qualifies.]

§ 3-203. Officers

From among the Council members, the Secretary of the Environment shall appoint a chairman, a vice chairman, and a secretary of the Council.

§ 3-204. Meetings; compensation; staff

(a) The Council shall meet at the times and places that the Secretary or the chairman determines.

(b) A member of the Council:

- (1) May not receive compensation; but**
- (2) Is entitled to reimbursement for expenses under the Standard State Travel Regulations, as provided in the State budget.**

(c) The Department shall provide the Council with secretarial and stenographic assistance

§ 3-205. Advisory Role of Council

(a) Before the Department adopts any environmental noise standard or sound level limit, the Department shall submit the proposed environmental noise standard or sound level limit to the Council for advice.

(b) Within 60 days after receiving a proposed environmental noise standard or sound level limit from the Department, the Council shall give the Department its advice on the proposal by recommending:

- (1) Adoption;**
- (2) Rejection; or**
- (3) Modification**

Statutory Changes Regarding Membership in the Committee

Subtitle 3. Interagency Noise Control Committee.

§ 3-301. Committee established.

There is an Interagency Noise Control Committee. (An. Code 1957, art. 43, § 827; 1982, ch. 240, § 2.)

§ 3-302. Composition; chairman.

(a) The Committee consists of:

- (1) 1 member of the Governor's executive staff, appointed by the Governor; and
- (2) 1 representative of each of the following departments, appointed by the Secretary of that department:

- (i) The Department of the Environment;
- (ii) The [State] Department of Transportation;
- (iii) The Department of Natural Resources;
- (iv) The DEPARTMENT [~~Office~~] of Planning **OR THE OFFICE OF SMART GROWTH; [-and]**
- (v) THE DEPARTMENT OF HEALTH AND MENTAL HYGIENE;
- (vi) THE DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT;
- (vii) THE DEPARTMENT OF LICENSING, LABOR AND REGULATION; AND
- (v)(viii) Any other principal department that develops, adopts, or enforces any noise control rule or regulation.

(b) Chairman. - The member who is appointed by the Secretary of the Environment is chairman of the Committee. (An. Code 1957, art. 43, § 827; 1982, ch. 240, § 2; 1987, ch. 306, § 16; 1988, ch. 6, § 11; 1989, ch. 540, § 1.)

§ 3-303. Meetings; compensation; staff.

(a) Meetings. - The Committee shall meet at least twice a year, at the times and places that it determines.

(b) Compensation and reimbursement for expenses. - A member of the Committee:

- (1) May not receive compensation; but
- (2) Is entitled to reimbursement for expenses under the Travel Regulations, as provided in the State budget.

(c) Staff; consultants, and facilities. - (1) In accordance budget, the Committee may:

- (i) Employ a staff;
- (ii) Employ consultants; and
- (iii) Obtain office facilities.

(2) The Department of the Environment shall provide the Committee with secretarial and stenographic assistance. (An. Code 1957, art. 43, § 827; 1982, ch. 240, § 2; 1987, ch. 306, § 16; 1988, ch. 6, § 11.)

§ 3-304. Duties of Committee.

(a) In general. - The Committee shall:

- (1) Receive reports of progress, problems, and proposed plans for attaining and maintaining State environmental noise standards from each agency that is represented on the Committee;

(2) Evaluate the adequacy of existing and proposed efforts to attain and maintain State environmental noise standards;

(3) Review the relationship of State noise control rules and regulations with other environmental laws, rules, regulations, standards, and programs; and

(4) Recommend new or revised noise control rules, regulations, or legislation.

§ 3-401

(b) Annual report. - If the Council requests, the annual report of the Committee shall include a report of the Council. (An. Code 1957, art. 43, § 827; 1982, ch. 240, § 2; 1991, ch. 55, § 6; 1992, ch. 432; 1993, ch. 4, § 2.)

Status - Dirt bikes / gun clubs
legislation is likely to come
regs. adopted June '04

Pres. - Nat'l Res. Policy
Comar. (regs.)
Statute 1/1/90
Limits - 90 dBA max
SAE J2005 @ idle (transom on boat)
w/ baffle baffles open → highest cell potential
Noise regs. - Ritter
Exemptions
Racing / practice
Seaford harvesters
"Econ. hardship" > 10% value

§ 8-725.4
31-18 - 2000-2002
drop. 2001

Complaints 50 - 2003

13 violations
2003
3- warnings

200,000 registered boats

Rich Peppin - Noise indoors

No standard way / metric

Comm noise
Bldg codes

Metric
meas. app.

enforcement

Hard to measure
no standard metric
function of struct.
bldg code
comm. noise
code.

Building codes - @ Co. level.

Geo. Harmon - Carroll Co. → consideration
of noise ord. not include
incorp'd towns
draft code develop'd - based on
state reg.
hearing coming.
Sheriff Office → "enforcer"

Illinois → paper on experience on complaint enforcement

Dec: State Police presentation

monitored @ truck weight stations

Commercial Veh.

Enf. Division

103 dB @ 3 ft. - trucks

100 @ - cars, others

Frank Gilustio - citizen pres. (noisy mufflers)

- illegal mufflers (motorcycles)

- cigarette boats

Ed Riky (AA Co. Council) → enforce existing reg.s
repair orders

Mary Bilaney - Legis. rep.

Transportation Article

22-6002

1-5-79

Inspection process →
COMAR issues

Final Draft
MEETING AGENDA
ENVIRONMENTAL NOISE ADVISORY COUNCIL
AND THE INTERAGENCY NOISE CONTROL COMMITTEE
Monday
Sep 20, 2004
9:00 AM to 11:30 PM
Aqua Room - Lobby
Maryland Department of the Environment
1800 Washington Blvd.

09:00 Welcome – Dr. George Luz, Chair, Noise Advisory Council

Welcome new member Alison Flatau, Ph.D., P.E. replacing Dr. Fred Schmitz

09:05 Member introductions

09:10 Status of things

09:20 DNR Boat Noise Issues – Policy, Complaints and Actions – Lt.Col. Tammy Broll

09:50 Richard Peppin – Indoor Noise Standards, Insulation, and indoor noise measurements

10:20 Break

11:00 Introduction of public concerns with motor vehicle noise
mufflers, motor cycles, manufacturing specifications

11:00 Public Presentations (if any)

12:00 (or sooner) Adjourn

Next Meeting

Monday December 6 - Planned focus - MVA and/or MSP Commercial Vehicle Enforcement
Section and Automotive Safety and Enforcement Division (mufflers, car stereos, etc.) –
to be invited

MDE Directions:

See: www.mde.state.md.us

Or Generally: The Big White building just to the north of I-95 at Washington Blvd.
(Montgomery Park). Enter at the Red parking lot near the intersection with Monroe St.
In the lobby, our reception desk is to the left.

NOISE SOLUTIONS BY GREG ZAK

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ASA TALK OUTLINE, 6-7-01

Since 1973, the State of Illinois has had noise regulations. Active enforcement of these regulations has been ongoing in different forms depending on what resources are available to accomplish this end. Prior to 1981, Illinois had the funding to actively investigate noise complaints and refer those cases that had merit to the Attorney General's Office for prosecution. The Illinois Noise Regulations can be broadly divided into two parts, one is nuisance, and the other is numerical. The numerical part consists of limits for steady-state noise, measured in octave bands at the nearest residential property line. The numerical sections also contain limits for impulsive noise measured in A-weighted decibels, and prominent discreet tones measured in third octave bands. Loss of funding for both state and federal noise programs resulted in virtually no enforcement after 1981. Illinois' one person noise program addressed this situation in 1987 by following the example of a lady in the northern part of the state named Lucille Wathen. Lucille had a complaint about the noise from her neighbor's residential air-conditioner in the late 1970's. The policy at the Illinois EPA in those days was to not investigate neighbor to neighbor complaints. Lucille proceeded on her own without an attorney. She asked the Illinois EPA to measure the noise levels at her property line, which we did. Using our measurements, she appeared before the Illinois Pollution Control Board. She presented her case and the Board found her neighbor guilty of nuisance noise pollution and ordered the 86 year old neighbor to stop creating noise with her air-conditioner. The neighbor solved the problem by ceasing to use her air-conditioner. Following the strategy of Ms. Wathen, the Illinois EPA began to assist citizens who phoned in or sent in a letter complaining of noise from 1987 to the present date, we called it SELF-HELP. The result has been more actual noise control from the 1990's to 2001 than was obtained prior to the 1981 programmatic cuts. The case load has been running at 2 to 3000 complaint calls per year.

The SELF-HELP program that evolved can best be understood through an actual example. In early 1996 I received a phone call from a lady named Mrs. Cohen. She lived in Palatine, Illinois near Chicago with her husband. They were very upset about noise 24 hours per day, 6

15

days per week from Overland, a trucking facility abutting their backyard. The noise consisted of clanging and banging from the loading and unloading of large semi-trucks, roaring noise along with the beeping of a backup alarm on a small vehicle used to move semi-trailers around the parking and dock areas.

She called Overland several times about the noise, yet it did not improve. She called local authorities who advised her to call the Illinois EPA.

I explained to her that I was the whole noise program, and in order to solve her noise problem it would take both of us working on it. I suggested she send a letter by certified mail to the owner or CEO of the company. She could find his name, title and address through a call to her local public library. Then she passed a petition around to her neighbors, and most supported her complaint as they too were impacted by the noise.

She sent a certified letter to the company president. In the letter she was cordial and friendly, reminding the company president that they were neighbors. She asked if he would fix the problem, if so, how, how long would it take, and please respond within 15 days. She sent me a copy of her letter and I opened a file on her case.

Two weeks later she called to tell me she had not gotten a satisfactory response. I prepared a letter detailing how to proceed. Enclosed was a completed example letter done by a lady attorney who had a noise complaint against the US Postal Service who had prevailed against them a few years previous to Mrs. Cohen's problem. The example letter was very well written, and contained references to the appropriate statutes and regulations for noise pollution, along with potential penalties for failure to comply. Also included were copies of all the pertinent statutes and regulations. Finally two trucking noise cases, heard and decided on by the Illinois Pollution Control Board in the complainant's favor were included to help Mrs. Cohen sort out which types of evidence were the most important in prevailing over the Overland trucking facility.

Mrs. Cohen prepared this letter as instructed and sent it to the company president, again by certified mail. The response again was a token one.

She called me again in about two weeks. I suggested that I send her a letter of instruction on how to file a formal complaint with the Pollution Control Board. After receiving it she completed the forms and sent it to the Board.

While her complaint was being considered by the Board, she called and told me she had taken extensive video tape of operations at the Overland trucking facility. I explained to her that because the camcorder had an automatic level control, the audio portion of the tape was inadmissible as evidence as there was no way to tell the decibel level of the trucking noise. She then said well how about if I include a sound level meter in the picture so that we can tell

16
precisely how loud it is? She had an idea that would prove to make video tape admissible as evidence. The meter she used was a digital sound level meter from Radio Shack. While far from a precise instrument, it put an approximate decibel level where previously there was none. Her methodology, with a little helpful technical advice from the Illinois EPA would prove to be a winning combination in the end.

The Cohens decided to use an attorney when presenting their case before the Board. They chose Bill Forcade, who formerly sat on the Illinois Pollution Control Board for 8 years and is an accomplished environmental attorney at the Chicago law firm of Jenner & Block. In 1998, Bill Forcade chose to call noise experts from both the private sector and the state to testify regarding the noise impact on the Cohens and their neighbors. The expert for the state was asked to not only give an opinion on the noise impact, but also to provide evidence of the efficacy of the Radio Shack meter. A small microphone calibrator was placed over the microphone, while on the witness stand. The meter read 94.0 dB, which exactly matched the output of the precision calibrator. Questions were asked regarding the various solutions to the noise problems along with the cost of implementing the various solutions. A 22' high noise barrier was suggested between the abutting residences and the Overland trucking facility. It would be located at the fence line on the Overland property. The height was necessary to break line of sight to the second floor bedrooms from the location of much of the trucking noise.

A minor technical flaw was found in the numerical data taken by the expert from the private sector resulting in his data being rejected by the Board for proving a numerical violation. His data was used to bolster the nuisance portion of the complaint in the Board's decision in favor of the complainants.

In 1999, the Board rendered a verdict in favor of the complainants. The Board order required the Overland trucking company to erect a 22' noise barrier between their facility and the homes in the Cohen's subdivision. Loading dock modifications were ordered to reduce the noise at the dock. The Board also ordered Overland to pay a \$15,000 fine.

For the last 29 years I have been asked, "What if a company ignores a Board order? What can be done then? My answer has always been that no company has refused to comply with a Board order. My stock answer would soon change.

Overland paid their fine 9 months late along with the accrued interest charges for paying a late penalty. Overland did not build the noise barrier, make loading dock modifications, or do anything else in the Board order. The attorney for the Cohens enlisted the aid of the Cook

County States Attorney along with the Illinois Attorney General's Office. The Cook County circuit court, having much stronger enforcement authority than the Pollution Control Board was asked to enforce the Board's order. The court ordered Overland's parent company Vitran, to pay a fine of \$250,000, pay additional fines of \$20,000 for each day it remained in the location next to the Cohen's neighborhood, and if not moved at the end of 5 days (as Overland had agreed to a few weeks before) warrants would be issued for the arrest of company officials for contempt of court. The effects of this order were sufficient for Vitran stock to dip slightly on Wall Street and rate mention that the dip was caused by a noise pollution fine in Illinois.

c:\zak\paper\asapaper2001.doc

18

From: "George Harman" <gharman@mde.state.md.us>
To: "Robert Bambarly" <rbambarly@mdot.state.md.us>, "Elaine Cornell" <ecornell@mdsp.org>, "Bill Dofflemyer" <ndofflemyer@mdsp.org>
Date: 09/14/2004 3:09:28 PM
Subject: Vehicle noise issues

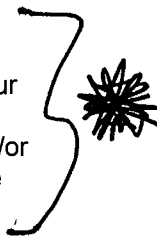
To MSP/MVA staff and Ken Polcak:

Please plan to attend a meeting at MDE (Montgomery Park) on Oct 5th at 10:00 to no later than 12:00 to discuss some issues regarding complaints received concerning automobile and possibly motorcycle noise.

I have taken a quick look at COMAR 11.14.07 and have some questions regarding the appropriateness of the relatively same standard (103 and 100 dB) at 3 ft from the end of pipe for both trucks and cars. It seems to me that for cars that operate more frequently on residential streets a more restrictive standard should apply. Cars operate where the distance to residential property is often less than 100 feet. If we want to protect at this distance to the 55 dB nighttime standard, they might need to start at 85 dB at 3 feet from their exhaust.

We will need to take a look at manufacturer specifications for cars and motorcycles, and also some European standards. I would also like to understand how the various sections of the Transportation Article are being enforced - specifically the 22-60x sections that relate to mufflers and certifications that must be submitted to MVA. Also, do we know what the typical differential is in noise levels for standard and modified cars, such as the Honda Civics that are so common today? Additionally, are there any means of restricting sales of exhaust systems that clearly result in violations? Will the auto parts suppliers be opposed to any efforts that might be initiated to restrict sales? Where would be the most appropriate place for vehicle noise to be checked and enforced? Emission stations?

We will open this discussion at the September 20th Noise Advisory Council held jointly with the Interagency Noise Advisory Committee meeting. I expect that there will be a number of public presenters. Our plan to meet on Oct 5th will help in defusing any concerns by the public. We will hold off having a formal presentation by the MSP and/or MVA on this matter until we after we meet in October and discuss the issues.



I would like to offer the Council and Committee a formal presentation at our December 6th meeting.

Elaine,

I don't have Mark Baton's or 1st Sgt Hickey's email. Please forward this to them with a copy to me so that I can get their email addresses.

A copy of this email is being provided to the Council Chair, Dr. George Luz, and another member (Rich Peppin) for advance consideration prior to the Sept. 20th meeting.

George Harman
MD Dept of the Environment, TARSA
1800 Washington Blvd., Suite 540
Baltimore, MD 21230-1718
Phone: 410-537-3856
Fax: 410-537-3873
gharman@mde.state.md.us

CC: <peppinr@asme.org>, "John Hill" <JHill@mde.state.md.us>,
<kpolcak@sha.state.md.us>, "George Luz" <sgeluz@yahoo.com>

Title 26

DEPARTMENT OF THE ENVIRONMENT

**Subtitle 02 OCCUPATIONAL, INDUSTRIAL,
AND RESIDENTIAL HAZARDS**

Chapter 03 Control of Noise Pollution

Authority: Environment Article §3-401,
Annotated Code of Maryland

Preface

The Environmental Noise Act of 1974 of the State of Maryland declares as policy the limitation of noise to that level which will protect the health, general welfare, and property of the people of the State. It requires that the Department assume responsibility for the jurisdiction over the level of noise, and prepare regulations for the control of noise, including the establishment of standards for ambient noise levels and equipment performance with respect to noise, for adoption by the Secretary of the Environment. Enforcement of the regulations and standards is the responsibility of the Department in all areas, using the facilities and services of local agencies within the areas to the greatest extent possible. The Department shall coordinate the programs of all State agencies relating to noise abatement, and each State agency prescribing sound level limits or regulations respecting noise shall obtain the endorsement of the Department in prescribing any limits or regulations.

.01 Definitions.

- A. "ANSI" means American national standards institute or its successor bodies.
- B. "Construction" means any site preparation, assembly, erection, repair, alteration, or similar activity.
- C. "Day-night average sound level (L_{dn})" means in decibels, the energy average sound level for a 24-hour day with a 10 decibel penalty applied to noise occurring during the nighttime period; i.e., noise levels occurring during the period from 10 p.m. one day until 7 a.m. the next are treated as though they were 10 dBA higher than they actually are. The use of the A-weighting is understood. The mathematical expression for L_{dn} is as follows:

$$L_{dn} = 10 \log_{10} \left[\left(\frac{15}{24} \right) 10^{L_d/10} + \left(\frac{9}{24} \right) 10^{(L_n+10)/10} \right]$$

Where L_d = the daytime average sound level.

L_n = the nighttime average sound level.

- D. "dBA" means abbreviation for the sound level in decibels determined by the A-weighting network of a sound level meter or by calculation from octave band or one-third octave band data.

E. "Daytime hours" means 7 a.m. to 10 p.m., local time.

F. "Decibel (dB)" means a unit of measure equal to ten times the logarithm to the base ten of the ratio of a particular sound pressure squared to a standard reference pressure squared. THE SQUARE OF THE SOUND PRESSURE TO THE SQUARE OF A STANDARD REFERENCE PRESSURE. For the purpose of this subtitle, 20 micropascals shall be the standard reference pressure.

- G. "Demolition" means any dismantling, destruction, or removal activities.

H. "Department" means the Department of the Environment.

I. "Emergency" means any occurrence or set of circumstances involving actual or imminent physical trauma or property damage, which demands immediate action.

J. "Environmental noise" means the noise that exists at any location from all sources.

K. "Environmental noise standards" means the goals for environmental noise, the attainment and maintenance of which, in defined areas and under specific conditions, are necessary to protect the public health and general welfare.

L. "equivalent sound level" (also "average sound level") means the level of a constant sound which, in a given situation and time period, would convey the same sound energy as does the actual time-varying sound during the same period. Equivalent sound level is the level of the time weighted, mean-square, A-weighted sound pressure. A numerical subscript may be used to indicate the time period under consideration; i.e., $L_{eq}(24)$ or $L_{eq}(8)$ for 24-hour and 8-hour periods, respectively. No subscript indicates a 24-hour period. The mathematical expression for the L_{eq} is as follows:

$$L_{eq} = 10 \log_{10} \left[\frac{1}{t_2 - t_1} \int_{t_1}^{t_2} 10^{L_A(t)/10} dt \right] \quad (dBA)$$

Where t_1 and t_2 are the beginning and ending times, respectively, of the period over which the average is determined, and $L_A(t)$ is the instantaneous A-weighted sound pressure level fluctuating with time.

M. "Nighttime hours" means 10 p.m. to 7 a.m., local time.

N. "Noise" means the intensity, frequency, duration and character of sound, including sound and vibration of sub-audible frequencies.

O. "Noise pollution" means the presence of noise of sufficient loudness, character, and duration, which whether from a single source or multiple sources, is, or may be predicted with reasonable certainty to be, injurious to health or which unreasonably interferes with the proper enjoyment of property or with any lawful business or activity.

P. "Periodic noise" means noise possessing a repetitive on-and-off characteristic **WITH A RAPID RISE TO MAXIMUM PEAK AND A SHORT DECAY NOT EXCEEDING 2 SECONDS.**

Q. "Person" means any individual, group of individuals, firm, partnership, voluntary association, or private, public, or municipal corporation, or political subdivision of the State, or Department, bureau, agency, or instrument of federal, State, or local government, responsible for the use of property.

R. "Prominent discrete tone" means any sound, which can be distinctly heard as a single pitch or a set of single pitches. For the purposes of this regulation, a prominent discrete tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound pressure levels of the 2 contiguous one-third octave bands by 5 dB for center frequencies of 500 Hz and above and by 8 dB for center frequencies between 160 and 400 Hz and by 15 dB for center frequencies less than or equal to 125 Hz.

S. "Sound level" means, in decibels, the weighted sound pressure level measured by the use of a sound level meter. ~~satisfying the requirements of ANSI S1.4 1971 "specifications for sound level meters"~~. Sound level and noise level are synonymous. The weighting employed shall always be specified.

T. "Sound level meter" means an instrument, meeting INTERNATIONAL ELECTROTECHNICAL COMMISSION AND AMERICAN NATIONAL STANDARDS INSTITUTE standards ~~ANSI S1.4 1971 "specifications for sound level meters"~~, comprising a microphone, an amplifier, an output meter, and frequency-weighting network(s) that is used for the measurement of sound pressure levels in a specified manner.

U. Sound pressure

1. "Sound pressure" means the ~~minute~~ fluctuations in atmospheric pressure, which accompany the passage of a sound wave.

2. ~~For a steady sound, the value of the sound pressure average over a period of time.~~

23. Sound pressure is usually measured in dynes per square centimeter (dyne/cm²), or in newtons per square meter (N/m²), or in micropascals (μPa).

V. "Sound pressure level" means, in decibels, 20 times the logarithm to the base ten of the ratio of a sound pressure to the reference sound pressure of 20 micropascals (20 micronewtons per square meter). In the absence of any modifier, the **PRESSURE level** is understood to be that of a root-mean-square pressure.

W. "Source" means any person or property, real or personal, contributing to noise pollution.

X. "Vibration" means any oscillatory motion of solid bodies.

Y. "Zoning district" means a general land use category, defined according to local subdivision, the activities and uses for which are generally uniform throughout the subdivision. For the purposes of this regulation, property which is not zoned "residential", "commercial", or "industrial", shall be classified according to use as follows:

- 22
- (1) "Commercial" means property used for buying and selling goods and services;
 - (2) "Industrial" means property used for manufacturing and storing goods;
 - (3) "Residential" means property used for dwellings.

References for T. "Sound Level meter":

- a. ANSI¹ S1.4-1983 (R 2001), American National Standard for Sound Level Meters
- b. ANSI S1.43-1997 (R2002), American National Standard Specifications for Integrating-Averaging Sound Level Meters
- c. IEC² 60651 Ed.1.2 b:1994, Sound level meters, International Electrotechnical Commission (IEC).
- d. IEC 60804 Ed. 2.0 b:2000, Integrating-averaging sound level meters
- e. IEC 61672-1:2002, "Electroacoustics- Sound level meters-Part 1: Specifications.

.02 Environmental Noise Standards.

A. Precepts.

(1) It is known that noise above certain levels is harmful to the health of humans. Although precise levels at which all adverse health effects occur have not definitely been ascertained, it is known that one's well-being can be affected by noise through loss of sleep, speech interference, hearing impairment, and a variety of other psychological and physiological factors. The establishment of ambient noise standards, or goals, must provide margins of safety in reaching conclusions based on available data which relate noise exposure to health and welfare effects, with due consideration to technical and economic factors.

(2) The environmental noise standards set forth here represent goals expressed in terms of equivalent A-weighted sound levels which are protective of the public health and welfare. The ambient noise levels shall be achieved through application, under provisions of laws or regulations or otherwise, of means for reducing noise levels including, but not limited to, isolation of noise producing equipment, dampening of sound waves by insulation, equipment modification and redesign, and land use management.

B. Standards for Environmental Noise--General.

(1) The standards are goals for the attainment of an adequate environment. The standards set out in regulation .03 are intended to achieve these goals.

(2) The following sound levels represent the standards for the State by general zoning district:

Table 1
Environmental Noise Standards

<i>Zoning district</i>	<i>Level</i>	<i>Measure</i>
Industrial	70 dBA	$L_{eq}(24)$
Commercial	64 dBA	L_{dn}
Residential	55 dBA	L_{dn}

.03 General Regulations.

A. Noise and vibration prohibitions.

(1) A person may not cause or permit noise levels which exceed those specified in table 2 except as provided in §A (2) or (3), or §B, below.

Table 2
Maximum Allowable Noise Levels (dBA)
For Receiving Land Use Categories

¹ American National Standards Institute (ANSI), 25.W 43rd St, New York, NY 10036

² International Electrotechnical Commission (IEC), Geneva, Switzerland [I need to check this] available from, Acoustical Society of America, 35 Pinelawn Rd, #114E, Melville, NY 11747

23

Effective date	Day/Night	Industrial	Commercial	Residential
	Day	75	67	65
Upon Adoption	Night	75	62	55

(2) A person may not cause or permit noise levels emanating from construction or demolition site activities, which exceed:

- (a) 90 dBA during daytime hours;
- (b) The levels specified in table 2 during nighttime hours

(3) A person may not cause or permit the emission of prominent discrete tones ~~and~~ **OR** periodic noises which exceed a level which is 5 dBA lower than the applicable level listed in Table 2.

(4) A person may not cause or permit beyond the property line of a source, vibration of sufficient intensity to cause another person to be aware of the vibration by such direct means as sensation of touch or visual observation of moving objects. The observer shall be located at or within the property line of the receiving property when vibration determinations are made.

(5) A PERSON SHALL NOT OPERATE OR PERMIT TO BE OPERATED AN OFF-ROAD INTERNAL COMBUSTION ENGINE POWERED RECREATIONAL VEHICLE, TO INCLUDE, BUT NOT LIMITED TO A DIRT BIKE, ALL TERRAIN VEHICLE, GO CART, SNOWMOBILE OR SIMILAR VEHICLES, ON PRIVATE PROPERTY, CLOSER THAN 300 FEET TO A NEIGHBORING RESIDENCE OR THE ASSOCIATED CURTILAGE WITHOUT THE WRITTEN PERMISSION OF THE AFFECTED RESIDENT, UNLESS IT CAN BE DEMONSTRATED TO THE DEPARTMENT THAT THE VEHICLE CAN BE OPERATED WITHIN THE NOISE LIMITS SPECIFIED IN TABLE 2 OF THIS REGULATION.

B.b. Exemptions.

(1) The provisions of this regulation may not apply to devices used solely for the purpose of warning, protecting, or alerting the public, or some segment thereof, of the existence of an emergency **OR HAZARDOUS** situation.

(2) The provisions of this regulation do not apply to the following:

- (a) Household tools and portable appliances in normal usage **DURING DAYTIME HOURS.**
- (b) Lawn care and snow removal equipment (daytime only) when used and maintained in accordance with the manufacturer's specifications.
- (c) Agricultural field machinery when used and maintained in accordance with the manufacturer's specifications.
- (d) Blasting operations for demolition, construction, and mining or quarrying (daytime only).
- (e) Motor vehicles on public roads.
- (f) Aircraft and related airport operations at airports licensed by the State aviation administration.
- (g) Boats on State waters or motor vehicles on State lands under the jurisdiction of the Department of natural resources.
- (h) Emergency operations.
- (i) Pile driving equipment during the daytime hours of 8 a.m. to 5 p.m.
- (j) ~~Sound not electronically amplified created by sporting, amusement, and entertainment events and other public gatherings operating according to terms and conditions of the appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facilities, parades, and public celebrations. This exemption only applies between the hours of 7 a.m. and 12 midnight.~~

(J) SOUND, EXCEPT THOSE SOUNDS THAT ARE ELECTRONICALLY AMPLIFIED, CREATED BY SPORTING EVENTS (EXCEPT TRAP SHOOTING, SKEET SHOOTING, OR OTHER TARGET SHOOTING), ENTERTAINMENT EVENTS AND OTHER PUBLIC GATHERINGS OPERATING UNDER PERMIT OR PERMISSION OF THE APPROPRIATE LOCAL JURISDICTION. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facilities, parades, and public celebrations. THIS EXEMPTION ONLY APPLIES BETWEEN THE HOURS OF 7 AM AND MIDNIGHT. IN

24

FREDERICK COUNTY OR FREDERICK CITY, A FAIR LISTED IN THE MARYLAND AGRICULTURAL FAIRS AND SHOWS SCHEDULE THAT IS MAINTAINED BY THE MARYLAND AGRICULTURAL FAIR BOARD, OR ANY OTHER EVENT HELD ON THE SAME GROUNDS AND LISTED BY THE AGRICULTURAL FAIR BOARD SHALL BE EXEMPT FROM STATE NOISE REGULATIONS.

(k) Rapid rail transit vehicles and railroads.

(l) Construction and repair work on public property.

(m) Air conditioning or heat pump equipment used to cool or heat housing on residential property. For this equipment, a person may not cause or permit noise levels which exceed 70 dBA for air conditioning equipment at receiving residential property and 75 dBA for heat pump equipment at receiving residential property.

(N) HOUSEHOLD PETS ON RESIDENTIAL PROPERTY THAT ARE MAINTAINED IN ACCORDANCE WITH LOCAL ZONING REQUIREMENTS.

(O) TRAP SHOOTING, SKEET SHOOTING, OR OTHER TARGET SHOOTING BETWEEN THE HOURS OF 9 AM AND 10 PM ON ANY RANGE OR OTHER PROPERTY OF A SHOOTING SPORTS CLUB THAT IS CHARTERED AND IN OPERATION AS OF JANUARY 1, 2001. THIS EXEMPTION DOES NOT APPLY IN ALLEGANY, ANNE ARUNDEL, BALTIMORE CITY, CALVERT, CHARLES, GARRETT, HOWARD, MONTGOMERY, ST. MARY'S AND WASHINGTON COUNTIES.

(P) TRASH COLLECTION OPERATIONS BETWEEN THE HOURS OF 7 AM AND 10 PM.

Ce. Variance procedure.

(1) Any person who believes that meeting the requirements of §A, above, is not practical in a particular case may request an exception to its requirements.

(2) Requests submitted to the Department shall be in writing and shall include evidence to show that compliance is not practical.

(3) Upon receipt of a request for an exception, the Department shall schedule a hearing to be held within 60 days.

(4) The applicant for the exception, at least 30 days before the hearing date, shall advertise prominently the hearing by placing a notice in a newspaper of general circulation in the subdivision in which the facility or source for which the exception is sought is located. The notice shall include the name of the facility or source and such additional information as the Department may require.

(5) Based upon evidence presented at the hearing, the secretary may grant an exception to §A, above, for a period not to exceed 5 years under terms and conditions appropriate to reduce the impact of the exception.

(6) Exceptions shall be renewable upon receipt by the Department of evidence that conditions under which the exception was originally granted have not changed significantly.

(7) APPLICANTS SHALL BE RESPONSIBLE FOR PUBLIC HEARING COSTS, AS DIRECTED BY THE DEPARTMENT, TO INCLUDE THE HEARING ADVERTISEMENT, FACILITY RENTAL, COURT REPORTER, AND THE PREPARATION OF THE TRANSCRIPT OF THE HEARING.

Dd. Measurement

(1) The equipment and techniques employed in the measurement of noise levels may be those recommended by the Department, which may, but need not, refer to currently accepted standards or recognized organizations, including, but not limited to, the American National Standard Institute (ANSI), American Society for Testing and Materials (ASTM), Society of Automotive Engineers (SAE), and the United States Environmental Protection Agency (EPA).

(2) The measurement of noise levels shall be conducted at points on or within the property line of the receiving property or the boundary of a zoning district, and may be conducted at any point for the determination of identity in multiple source situations.

(3) Sound level meters used to determine compliance with regulation .03 shall meet or exceed the specifications FOR TYPE 2 of the American National Standards Institute or its successor bodies ANSI s1.4-1971 for type ii sound level meters.

.04 Emission Regulations.
Reserved.

25

.05 penalties

- a. Civil penalty. Any person who willfully violates these regulations shall be liable to a civil penalty of not more than \$10,000. Each day during which a violation continues there shall be liability for a separate penalty.
- b. Plan for compliance. A violator who has submitted a plan for compliance with these regulations and has that plan or amendments to it approved by the secretary, upon recommendation of the Department, may not be considered to be in violation of these regulations as long as he acts in accordance with the original or amended plan.

Administrative history

Effective date August 6, 1975 (2:17 Md. R. 1189)

Regulation .01A-1, W-1 adopted effective February 15, 1982 (9:3 M. R. 222); repealed effective March 28, 1983 (10:6 Md. R. 558)

Regulations .01 and .03A, B, D amended effective September 14, 1977 (4:19 Md. R. 1468)

Regulation .01C amended effective march 28, 1983 (10:6 M. R. 558)

Regulations .01C, Q; .02B; .03B, D amended effective February 15, 1982 (9:3 Md. R. 222)

Regulation .03A amended as an emergency provision effective November 13, 1979 (6:24 Md. R. 1917);

emergency status expired Mach 29, 1980

Regulation .03A and B amended effective March 28m, 1983 (10:6 Md. R. 558)

Regulation .04 repealed effective September14, 1977 (4:19 Md. R. 1468)

Chapter recodified from COMAR 10.20.01 to COMAR 26.02.03

INTERAGENCY Noise Committee

26

- Reg change find adoption (end of June)
- Curtalage (fenced area) effective 10 days aft. pub in MD Register

- Geo. Lutz - returning from Army - not from ASA.

- Dave Jankos - Retired John Hill - Citi new guy

- Geo. Lutz - Self-Help Manual. → NoiseCon 04 paper
Brochure - review

EJ + Noise Dr. Andrew Sawyer (MDE)

HB 1350

HB 970 - EJ. reg.

Noise Concerns

- Health issues - sleep disturb. / depress.
- hearing.
- truck emissions (including air pollution)
- respiratory.
- Land Use Planning / Control.
- Lack of noise sensitive uses / design of buffers.
high performance buffers (barriers)
- Truck/Traffic Speed. - retrofit technology
- property rights vs. impacts to others / adjacent
- Noise insulation of private homes.

Objective vs. subjective (ambiguous noise)
annoyance vs. actual / objective measures)

Shared responsibility model.

Incentives for "quiet"

Alt. dispute resolution (independent third party)

Strategic enforcement / self cert. process
compliance assistance

a Opportunities

● Collab. Results: benefits.

Computer system (since Jan 1)
(up)

11 120 / complaints (41 cases)

13 of 24 jurisdictions

has
Balt.
AA...

- Encourage local govts to control

- Need tools to guide developers

- Fed / State resources

- Boston Times → the haffle 2nd party address.

"shared responsibility"

* same Policy → don't do studies in Co's w/o LC controls

Types - off road vehicles - 10 (dirt bikes) (John Hill)

HVAC

Dumpsters

Truck noise

Cars / motorcycles

Construction noise

By end of yr. → will be up and fully running (database)

* Stats on complaints. (for next mtg.)
(SHA)

* Tighten up "where to measure"

property line vs. "curtilage" vs. (area of prop. human use)

* contacts from MVA for George
MSP - for George
Civics (and mufflers, jake-brakes)
Civics noise

Draft
Environmental Noise Advisory Council
And
Interagency Noise Advisory Committee
Meeting Minutes
May 17, 2004
Aqua Conference Room, MDE

*Review
5th comment
paragraph*

Attendees:

Dr. George Luz, Co-Chair
Dr. Fred Schmitz, Co-Chair
Dr. Jerrie Cherry, Med Chi
Dr. Paula S. Derry
Jeannie Ripley, College Park
Bill Grabau, MOSH
George Harman, MDE
Matthew Zimmerman, Council, MDE
John Hill, MDE
Rich Peppin, ScanTech
John Quinn, Constellation Energy
Charles Zeleski, DHMH, Local Health
Ken Polcak, DOT-SHA
Ron Nelson, MADE
Ray Bourland, Allegheny Energy
Joe Miedusiewski, Semmus
Jim Caffrey

Welcome and Introductions:

News Updates: MDE's Noise regulations that have been under consideration and public review should be promulgated in final by the end of June. The announced changes were published in the Jan 23, 2004 Maryland Register. Public comments were received through March 24, 2004. No one appeared at the public hearing on March 2, 2004. The only change will be the addition of a definition for the word "curtilage". (addendum, after the meeting it was also noted that "American" was left out of the "National Standards Institute". Therefore that will also be added.

Status of Legislation: There were no legislative items relating to noise during the 2004 session.

Transitions: Dr. George Luz is retiring from the Dept of Defense, but will continue on the Noise Council as a representative of the Acoustical Society of America. Dr. Fred Schmitz will enter his second retirement. This time from the U of MD and will be leaving the state. His service during the past two years on the Council has been greatly

29

appreciated. Dave Jarinko, the MDE noise specialist for the past six years tendered his resignation in March. John Hill is working in his position until a permanent replacement is identified.

Presentation: Dr. Andrew Sawyers from MDE's Office of the Secretary provided comments on Environmental Justice, with emphasis on noise issues.

Presentation: Dr. Luz provided some information on complaints that Aberdeen's gun blasts were eroding the cliffs on the Eastern Shore opposite Aberdeen. He indicated that the air transmitted sound waves do not have the necessary energy to induce erosion, and that the seismic waves produced at the impact areas do not transmit sufficient energy to result in erosive energy at the complainants' sites.

Community Self-Help Manual: Dr. Luz provided an update of his efforts to assemble self-help information.

MDE's Noise Statistics: Records of calls, letters, and complaints are now being computerized. Previous records are unavailable for computerization. The new database was initiated in January, and complaints were not fully documented until March. The current statistics are not, therefore, fully representative of the time period, and should not be used to project annual information.

Comments suggested that additional complaint information should be sought from representative local and county governments, DNR, SHA, and other agencies in an attempt to obtain a more defined representation of noise concerns across the state. Even with the additional information on complaints, it was explained that many issues are handled by local police, zoning agencies, and liquor boards and that any attempt to present data as being fully representative would not be appropriate.

It was suggested that MDE advertise its functions more prominently, especially on its website.

Issues Explored:

- A 1976 Attorney General opinion regarding the sporting and amusement event exemption was presented. The opinion indicated that the exemption was based on EPA testimony that sporting and amusement events were of a short duration, and usually occurred at a frequency of less than once per week. Thus, their overall contribution to environmental noise was minimal and should therefore be exempt.

Given the basis for the exemption (short term event duration and reoccurrence), should the exemption remain as open and all-inclusive as it is?

- A complaint regarding drum playing in a townhouse raised the question of whether the state should develop standards to address noise between units in townhouse, apartment, and condominium properties since MDE's outdoor standards are not necessarily applicable or protective.

The initial comments suggested that these situations are typically and most appropriately handled by property managers, lease agreements, or local police. Since base frequencies are the primary sounds transmitted through walls, the question of a need for base frequency standards was also mentioned. A presentation providing some additional information on indoor standards, measurement concerns, and base frequencies will be presented at the next meeting.

- Mention was made that one of the public comments expressed concern that electronically amplified noise was often equivalent to crowd noise and should not be regulated. MDE stated that the type of noise is often more annoying and it can be managed through simple volume control and use of multiple speakers instead of limited numbers of large central speakers. Several examples of concerns were expressed.
- Measurement procedures – Fast Lmax versus Slow Lmax had been requested to be placed on the agenda. It was explained that the previous attempt to codify the typical practice had raised external concerns and that it was argued that no change should be implemented without extensive impact evaluation. Given that the Department has discretion in selecting the method, and that there are not known to be any differences in results for the majority of noises that have been measured in recent years, it was agreed to retain the existing open-ended language in the standards table.
- A question was raised as to whether there are any complaints regarding cigarette boats. It was recommended that DNR be specifically invited to provide comment regarding this issue since it falls within their regulatory purview.
- State Highway offered some comments regarding their highway noise program and that at least two counties have developed regulations to address encroachment of building to state highways. These counties are requiring additional noise standards in construction near state highways.
- MSP and/or MVA will be invited to present information on their noise programs at a future meeting.

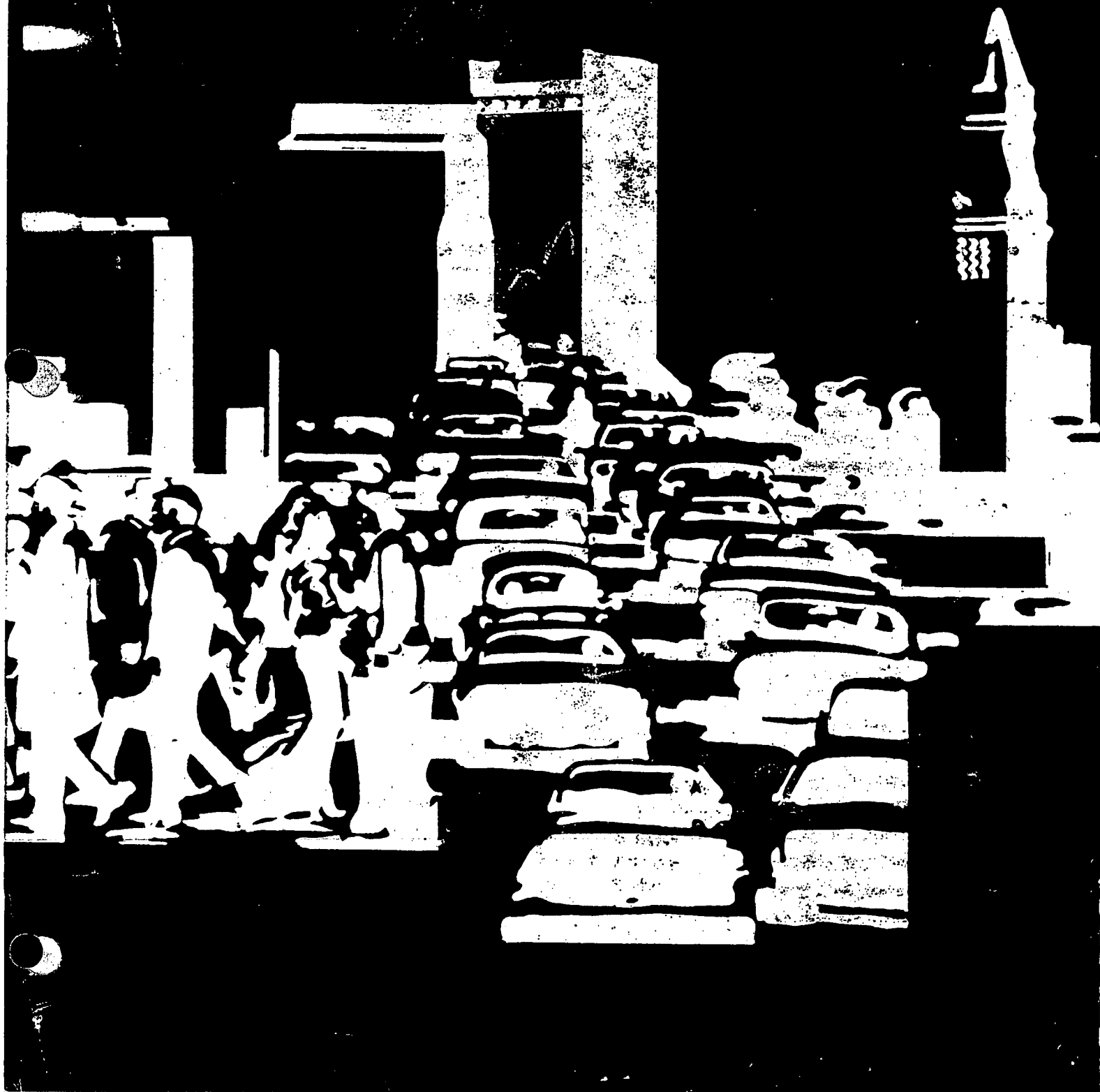
Public Comment: No one was present to provide public comment.

Future Meetings: Monday, September 20, 2004 and Monday, December 6, 2004.



Protective Noise Levels

Condensed Version of EPA Levels Document



PURPOSE

This publication is intended to complement the EPA's "Levels Document,"* the 1974 report examining levels of environmental noise necessary to protect public health and welfare. It interprets the contents of the Levels Document in less technical terms for people who wish to better understand the concepts presented there, and how the protective levels were identified. In that sense, this publication may serve as an introduction, or a supplement, to the Levels Document.

*"Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," EPA/ONAC 550/9-74-004, March, 1974.

TABLE OF CONTENTS

	PAGE
PURPOSE.....	ii
TABLE OF CONTENTS.....	iii
INTRODUCTION.....	1
ABOUT SOUND.....	3
Amplitude.....	3
Frequency.....	3
Time Pattern.....	3
MEASUREMENT OF ENVIRONMENTAL NOISE: SOUND DESCRIPTORS.....	3
A-Weighted Sound Level.....	4
Sound Exposure Level.....	4
Equivalent Sound Level.....	4
Day-Night Sound Level.....	9
LEVELS OF ENVIRONMENTAL NOISE IN THE UNITED STATES.....	9
Outdoor Levels.....	9
Relationship Between Indoor and Outdoor Levels.....	11
INDIVIDUAL NOISE EXPOSURE PATTERNS.....	11
HEARING DAMAGE FROM ENVIRONMENTAL NOISE.....	15
Basic Assumptions Involved in Determining Protective Levels.....	15
Calculation of the Maximum Allowable Noise Exposure.....	17
Discussion of Assumptions.....	17
SPEECH COMMUNICATION.....	18
Speech Interference Indoors.....	18
Speech Interference Outdoors.....	18
Discussion.....	20
ACTIVITY INTERFERENCE AND ANNOYANCE.....	20
Activity Interference.....	20
Community Reactions to Noise.....	21
Social Surveys.....	21
Discussion.....	21
SUMMARY.....	24
MISUSES, MISUNDERSTANDINGS, AND QUESTIONS.....	24

INTRODUCTION

During the last 20 years there has been increasing concern with the quality of the environment. Along with air and water contaminants, noise has been recognized as a serious pollutant. As noise levels have risen, the effects of noise have become pervasive and more apparent.

Noise is defined as "unwanted sound." In the context of protecting the public health and welfare, noise implies adverse effects on people and the environment. Noise causes hearing loss, interferes with human activities at home and work, and is in various ways injurious to people's health and well-being. Although hearing loss is the most clearly measurable health hazard, noise is also linked to other physiological and psychological problems.

Noise annoys, awakens, angers and frustrates people. It disrupts communication and individual thoughts, and affects performance capability. Noise is one of the biological stressors associated with everyday life. Thus, the numerous effects of noise combine to detract from the quality of people's lives and the environment.

Noise emanates from many different sources. Transportation noise, industrial noise, construction noise, household noise, and people and animal noise are all large-scale offenders. It is important, then, to examine the total range and combination of noise sources and not to focus unduly on any one source.

Through the Noise Control Act of 1972, Congress directed the Environmental Protection Agency (EPA) to publish scientific information about the kind and extent of all identifiable effects of different qualities and quantities of noise. EPA was also directed to define acceptable levels under various conditions which would protect public health and welfare with an adequate margin of safety. The EPA collaborated with other Federal agencies and the scientific community to publish a "Levels Document,"* which would fulfill these requirements in the Noise Control Act.

Initial public reaction was quite favorable, but it was discovered that the document was too complex, too technical, and too long for some audiences. This summary presents the contents of the Levels Document in less technical terms. It defines the basic measurement of noise, analyzes noise exposure, and presents the best understood effects of noise — hearing damage, speech interference, and annoyance — using information contained in the Levels Document. The identified protective levels are then summarized, followed by a number of often-asked questions and answers about the Levels Document.

No attempt has been made here to incorporate recent research findings pertaining to effects of noise on people. Considerable new information has developed since initial publication of the Levels Document, including new findings on community response to noise, sleep disruption, and speech interference. Summaries and analyses of some recent information on noise effects are available through EPA and other agencies.

*"Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety", EPA 550/9-74-004, March, 1974, U.S. Environmental Protection Agency, Washington, D.C. 20460.

ABOUT SOUND

35

The sound we hear is the result of a sound source inducing vibration in the air. The vibration produces alternating band of relatively dense and sparse particles of air, spreading outward from the source in the same way as ripples do on water after a stone is thrown into it. The result of the movement of the particles is a fluctuation in the normal atmospheric pressure, or sound waves. These waves radiate in all directions from the source and may be reflected and scattered or, like other wave actions, may turn corners. When the source stops vibrating, the sound waves disappear almost instantaneously, and the sound ceases. The ear is extremely sensitive to sound pressure fluctuations, which are converted into auditory sensations.

Sound may be described in terms of three variables:

1. Amplitude (perceived as loudness)
2. Frequency (perceived as pitch)
3. Time pattern

Amplitude

Sound pressure is the amplitude or measure of the difference between atmospheric pressure (with no sound present) and the total pressure (with sound present). Although there are other measures of sound amplitude, sound pressure is the fundamental measure and is the basic ingredient of the various measurement descriptors in the next section, "Measurement of Environmental Noise."

The unit of sound pressure is the decibel (dB); thus it is said that a sound pressure level is a certain number of decibels. The decibel scale is a logarithmic scale, not a linear one such as the scale of length. A logarithmic scale is used because the range of sound intensities is so great that it is convenient to compress the scale to encompass all the sounds that need to be measured. The human ear has an extremely wide range of response to sound amplitude. Sharply painful sound is 10 million times greater in sound pressure than the least audible sound. In decibels, this 10 million to 1 ratio is simplified logarithmically to 140 dB.

Another unusual property of the decibel scale is that the sound pressure levels of two separate sounds are not directly (that is, arithmetically) additive. For example, if a sound of 70 dB is added to another sound of 70 dB, the total is only a 3-decibel increase (to 73 dB), not a doubling to 140 dB. Furthermore, if two sounds are of different levels, the lower level adds less to the higher as this difference increases. If the difference is as much as 10 dB, the lower level adds almost nothing to the higher level. In other words, adding a 60 decibel sound to a 70 decibel sound only increases the total sound pressure level less than one-half decibel.

Frequency

The rate at which a sound source vibrates, or makes the air vibrate, determines frequency. The unit of time is usually one second and the term "Hertz" (after an early investigator of the physics of sound) is used to designate the number of cycles per second.

The human ear and that of most animals has a wide range of response. Humans can identify sounds with frequencies from about 16 Hz (Hertz) to 20,000 Hz. Because pure tones are relatively rare in real-life situations, most sounds consist instead of a complex mixture of many frequencies.

Time Pattern

The temporal nature of sound may be described in terms of its pattern of time and level: continuity, fluctuation, impulsiveness, intermittency. Continuous sounds are those produced for relatively long periods at a constant level, such as the noise of a waterfall. Intermittent sounds are those which are produced for short periods, such as the ringing of a telephone or aircraft take-offs and landings. Impulse noises are sounds which are produced in an extremely short span of time, such as a pistol shot or a hand clap. Fluctuating sounds vary in level over time, such as the loudness of traffic sounds at a busy intersection.

MEASUREMENT OF ENVIRONMENTAL NOISE: SOUND DESCRIPTORS

EPA has adopted a system of four "sound descriptors" to summarize how people hear sound and to determine the impact of environmental noise on public health and welfare. These four descriptors are: the A-weighted Sound Level, A-weighted Sound Exposure Level, Equivalent Sound Level, and Day-Night

36

Sound Level. They are related but each is most useful for a particular type of measurement. The descriptors and some examples of their uses are described below.

A-weighted Sound Level

One's ability to hear a sound depends greatly on the frequency composition of the sound. People hear sounds most readily when the predominant sound energy occurs at frequencies between 1000 and 6000 Hertz (cycles per second). Sounds at frequencies above 10,000 Hertz (such as high-pitched hissing) are much more difficult to hear, as are sounds at frequencies below about 100 Hz (such as a low rumble). To measure sound on a scale that approximates the way it is heard by people, more weight must be given to the frequencies that people hear more easily.

A method for weighting the frequency spectrum to mimic the human ear has been sought for years. Many different scales of sound measurement, including A-weighted sound level (and also B, C, D, and E-weighted sound levels) have evolved in this search. A-weighting was recommended by EPA to describe environmental noise because it is convenient to use, accurate for most purposes, and is used extensively throughout the world. Figure 1 shows the A-weighted levels of some environmental noises. Note that these ranges of measured values are the maximum sound levels.

The A-weighting of frequency also is used in the three descriptors discussed below. When used by itself, an A-weighted decibel value denotes either a sound level at a given instant, a maximum level, or a steady-state level. The following three descriptors are used to summarize those levels which vary over time.

Sound Exposure Level

Since the levels of many sounds change from moment to moment, this variation must also be accounted for when measuring environmental noise. One method for measuring the changing magnitude of sound levels is to trace a line on a sheet of moving paper, so that the movement of the pen is proportional to the sound level in decibels. Figure 2 illustrates such a recording, about which several features are noteworthy. First, the sound level varies with time over a range of about 30 dB. Second, the sound appears to be characterized by a fairly steady-state lower level, upon which are superimposed sound levels associated with individual events. This fairly constant lower level is often called the background ambient sound level. Each single event in Figure 2 may be partially characterized by its maximum level. It may also be partially characterized by its time pattern. In the example, the sound level of the aircraft is above that of the background ambient level for about a minute, whereas the sound levels from cars are above the background level for much less time.

The duration of sounds with levels that vary from moment to moment is more difficult to characterize. One way is to combine the maximum sound level with the length of time during which the sound level is greater than a certain number of decibels below the maximum level — for example, the number of seconds that the sound rises from 10 dB below maximum, as in Figure 3.

Using this procedure one can measure the total energy of the sound by summing the intensity during the exposure duration. This procedure produces the second measurement descriptor, *sound exposure level* (L_s), referred to in the Levels Document as the single event noise exposure level (SENEL).

Equivalent Sound Level

Yet another method of quantifying the noise environment is to determine the value of a steady-state sound which has the same A-weighted sound energy as that contained in the time-varying sound. This is the third measurement descriptor, termed the *Equivalent Sound Level* (L_{eq}). The Equivalent Sound Level is a single value of sound level for any desired duration, which includes *all* of the time-varying sound energy in the measurement period. In Figure 2, for example, the L_{eq} equals about 58 dB, indicating that the amount of sound energy in all the peaks and valleys in the figure is equivalent to the energy in a continuous sound of 58 dB.

The major virtue of the Equivalent Sound Level is that it correlates reasonably well with the effects of noise on people, even for wide variations in environmental sound levels and time patterns. It is used when only the durations and levels of sound, and not their times of occurrence (day or night), are relevant. It is easily measurable by available equipment. It also is the basis of a fourth and final measurement descriptor of the total outdoor noise environment, the *Day-Night Sound Level* (L_{dn}).

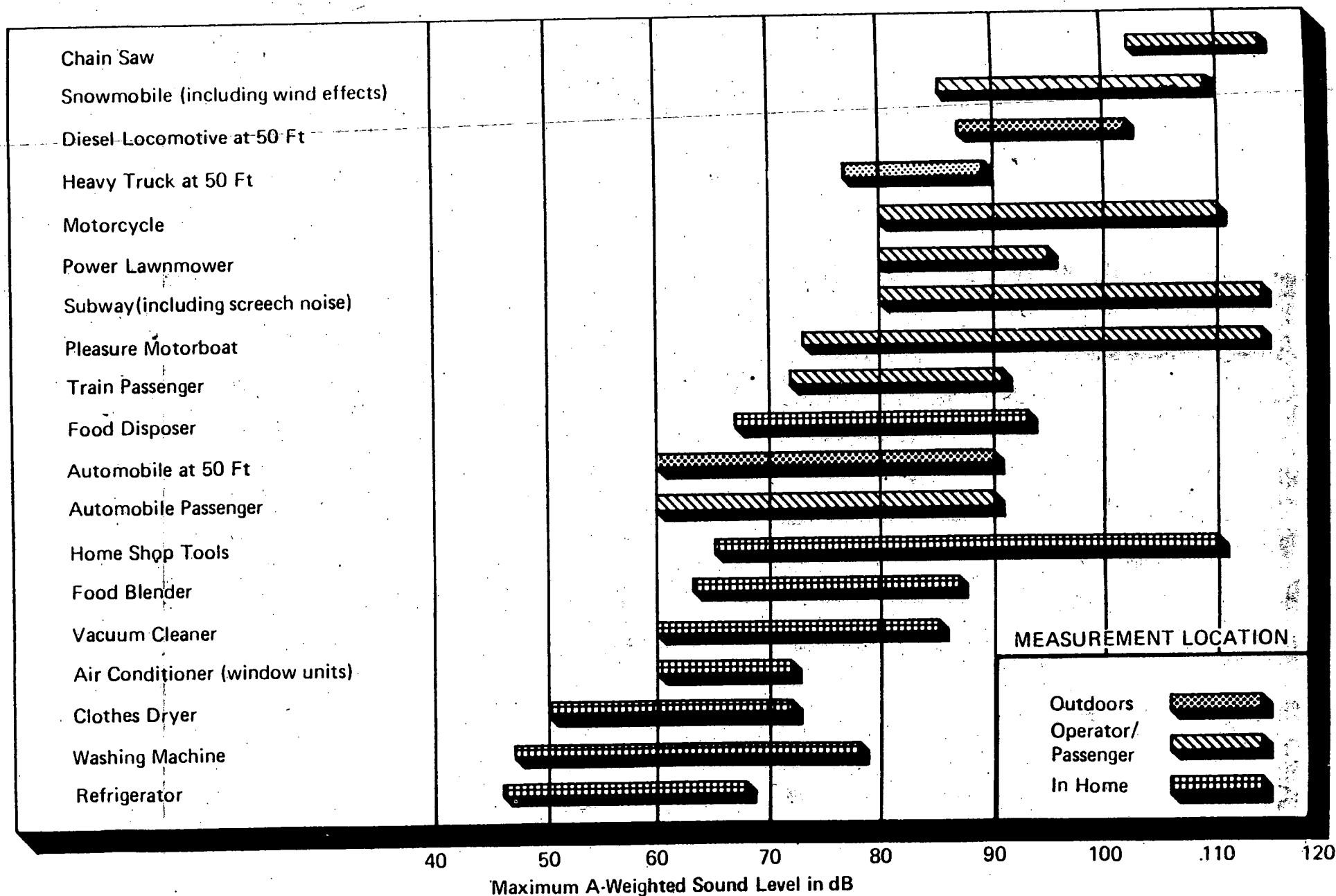


FIGURE 1. TYPICAL RANGE OF COMMON SOUNDS

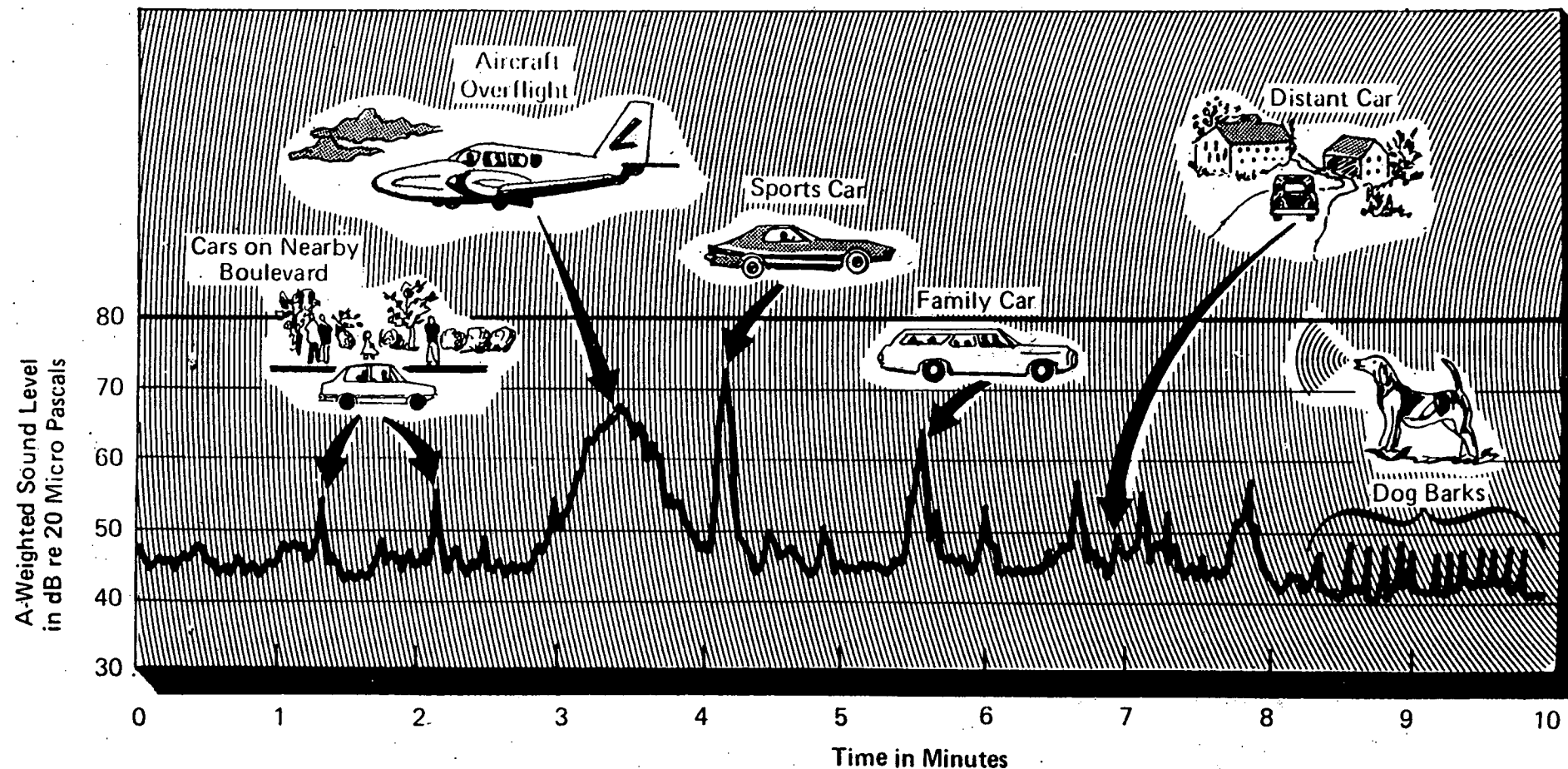


FIGURE 2. TYPICAL OUTDOOR SOUND MEASURED ON A
QUIET SUBURBAN STREET

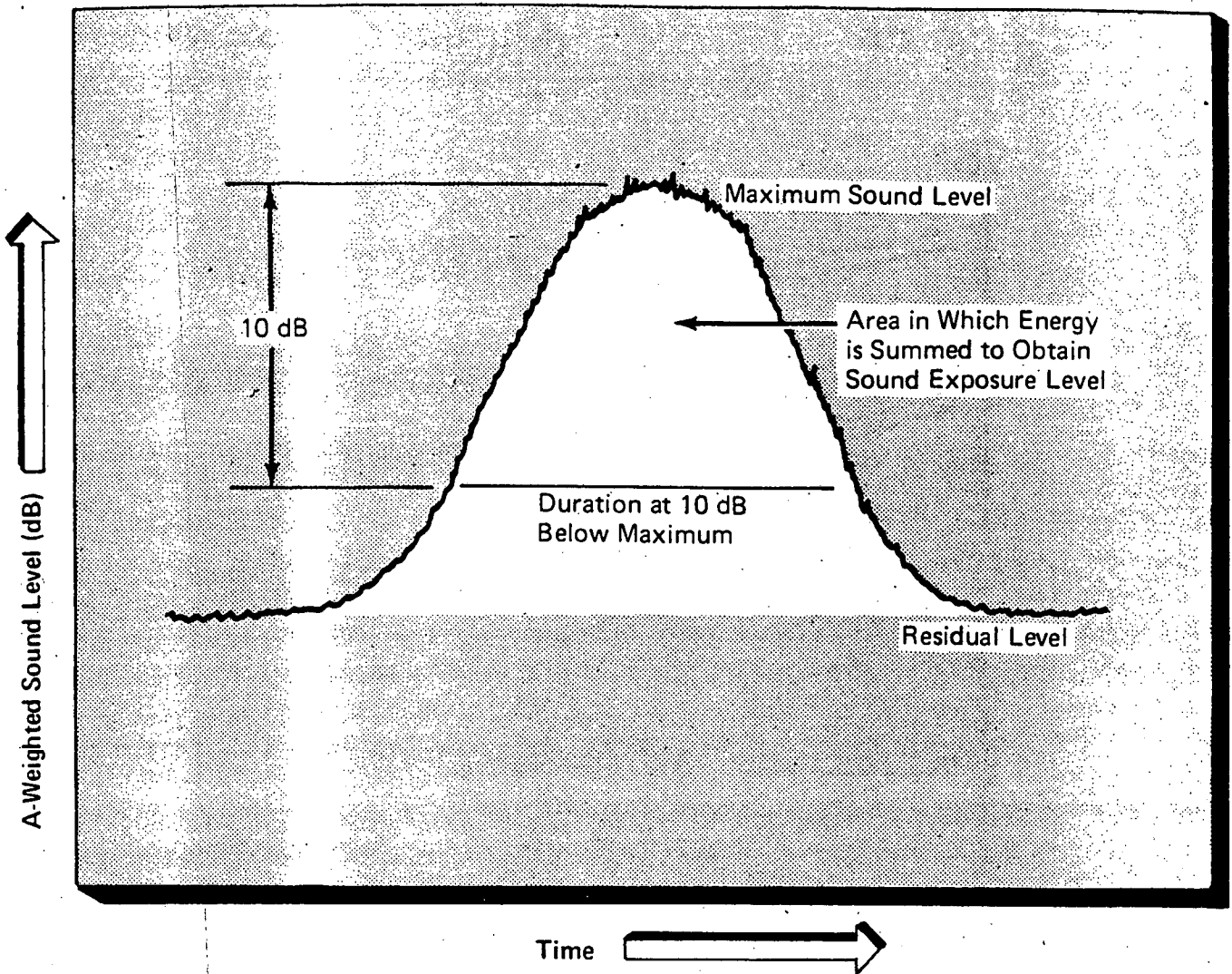


FIGURE 3. DESCRIPTION OF THE SOUND OF A SINGLE EVENT

L_{dn} in dB

Outdoor Location

40

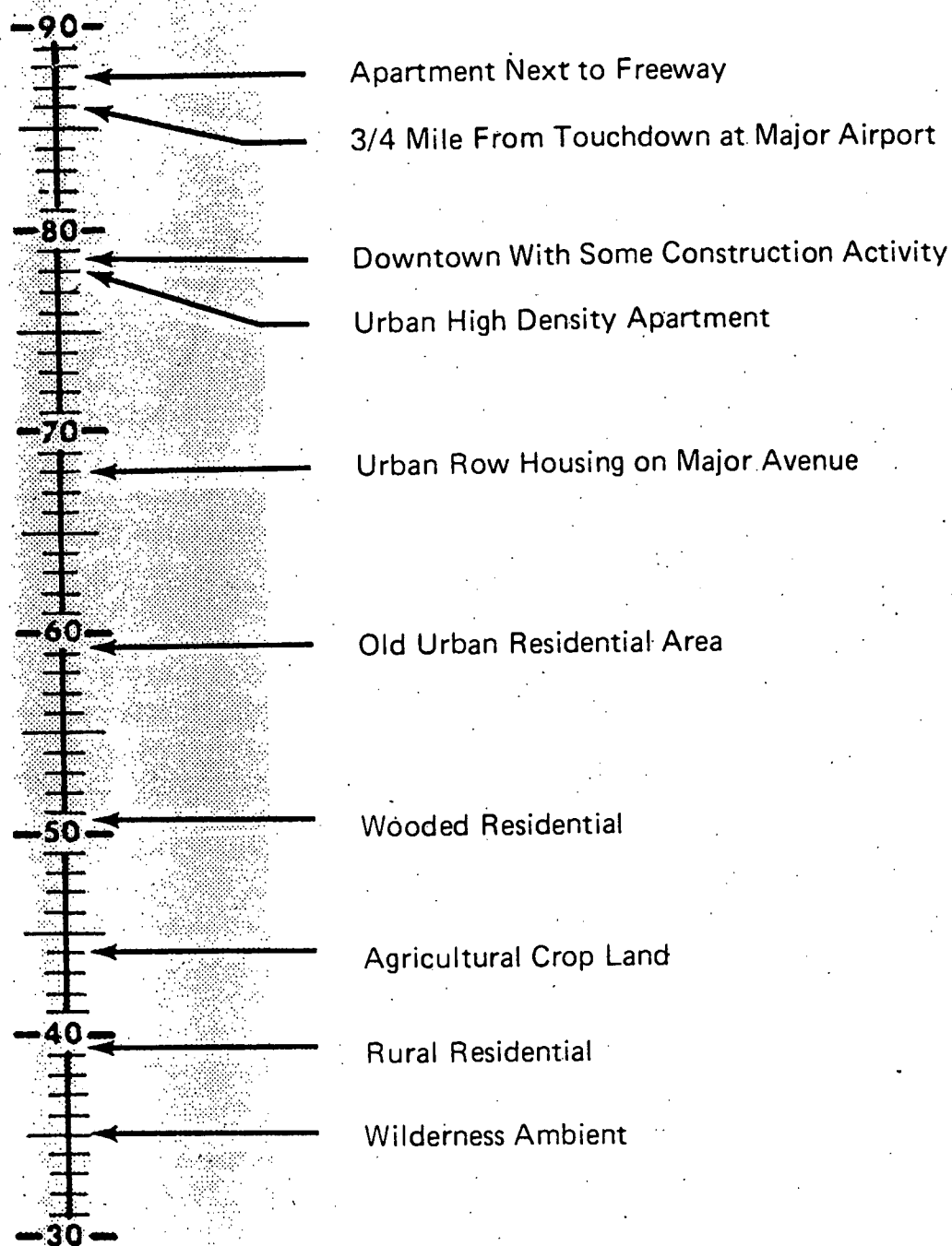


FIGURE 4. EXAMPLES OF OUTDOOR DAY-NIGHT AVERAGE SOUND LEVELS IN dB MEASURED AT VARIOUS LOCATIONS

Day-Night Sound Level

41

The Day-Night Sound Level is the A-weighted equivalent sound level for a 24-hour period with an additional 10 dB weighting imposed on the equivalent sound levels occurring during nighttime hours (10 pm to 7 am). Hence, an environment that has a measured daytime equivalent sound level of 60 dB and a measured nighttime equivalent sound level of 50 dB, can be said to have a weighted nighttime sound level of 60 dB (50 + 10) and an L_{dn} of 60 dB. Examples of measured L_{dn} values are shown in Figure 4. Table I summarizes the use of the four sound descriptors used by EPA.

Table I. Descriptors of Sound*

TYPICAL USE	NAME OF DESCRIPTOR	NATURE OF DESCRIPTOR
To describe steady airconditioning sound in a room or measure maximum sound level during a vehicle passby with a simple sound level meter.	A-weighted Sound Level	The momentary magnitude of sound weighted to approximate the ear's frequency sensitivity.
To describe noise from a moving source such as an airplane, train, or truck.	A-weighted Sound Exposure Level	A summation of the energy of the momentary magnitudes of sound associated with a single event to measure the total sound energy of the event.
To measure average environmental noise levels to which people are exposed.	Equivalent Sound Level	The A-weighted sound level that is "equivalent" to an actual time varying sound level, in the sense that it has the same total energy for the duration of the sound.
To characterize average sound levels in residential areas throughout the day and night.	Day-Night Sound Level	The A-weighted equivalent sound level for a 24-hour period with 10 decibels added to nighttime sounds (10 pm - 7 am).

*The unit for all descriptors is the decibel.

LEVELS OF ENVIRONMENTAL NOISE IN THE UNITED STATES

In residential areas of the United States, major contributions to outdoor noise come from transportation, industrial, construction, human and animal sources. Inside homes, appliances, radio and television, as well as people and animals, are predominant noise sources. On the job, workplace equipment can create moderate to extremely high levels of noise. The daily noise exposure of people depends on how much time they spend in different outdoor and indoor locations and on the noise environments in these places. Typical daily exposure patterns are discussed in this section, following short descriptions of outdoor and indoor levels of environmental noise throughout the United States.

Outdoor Levels

The noise environment outside residences in the United States can be highly variable. As seen in Figure 4, outdoor Day-Night Sound Levels in different areas vary over a range of 50 dB. Levels occur as low as $L_{dn} = 30$ to 40 dB in wilderness areas and as high as $L_{dn} = 85$ to 90 dB in urban areas.

Most Americans live in areas with a much smaller range of outdoor noise levels. Figure 5 shows that for urban dwellers (roughly 135 million people, more than half the U.S. population), 87% live in areas of $L_{dn} = 48$ and higher from traffic noise alone. Most of the other 13% of the urban population experience lower noise levels than those of Figure 5. Figure 5 also shows that nearly half of the urban population live in areas exposed to traffic sounds that range over only 5 dB ($L_{dn} = 55$ to 60 dB). Rural populations enjoy average outdoor sound levels generally lower than $L_{dn} = 50$ dB.

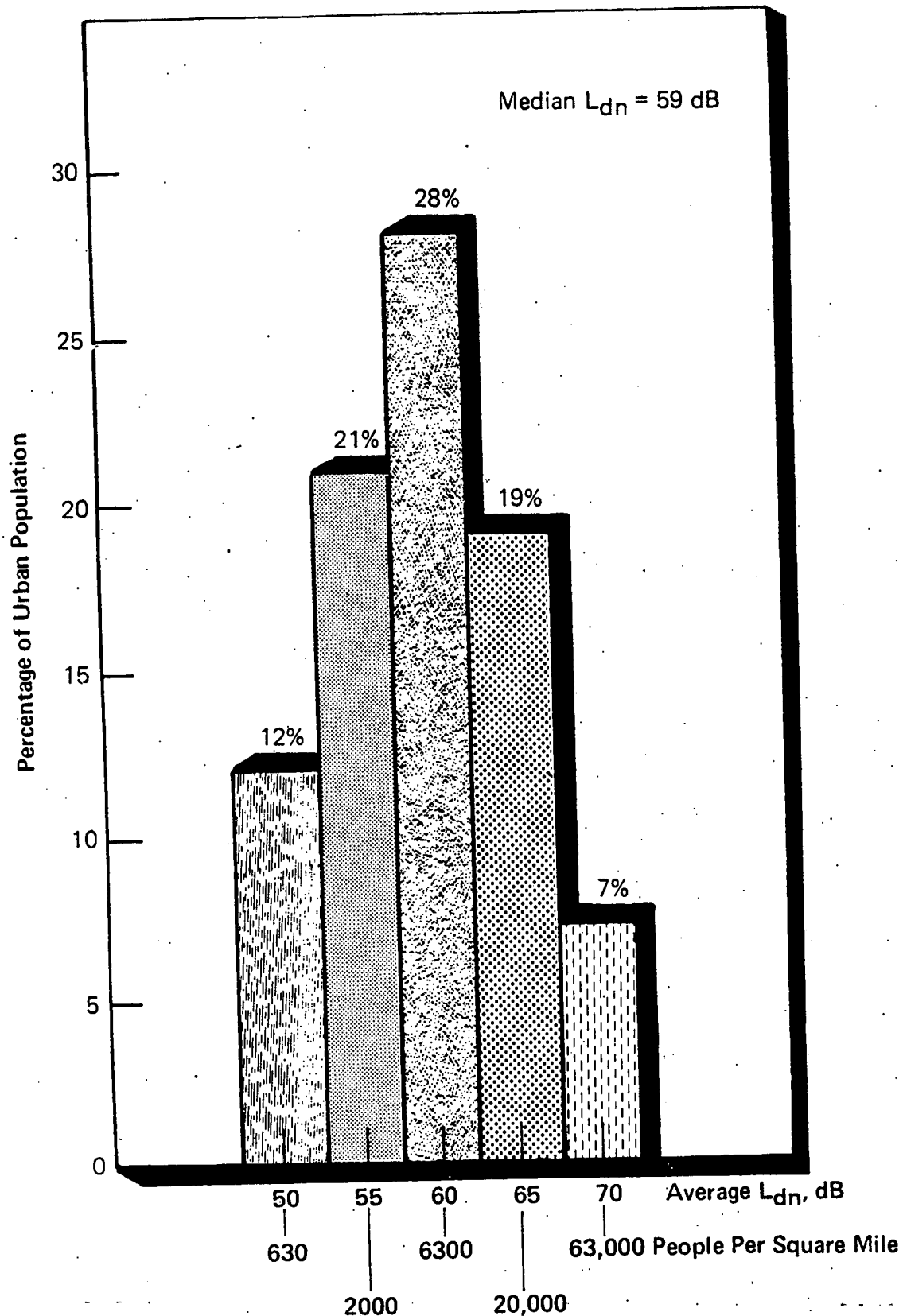


FIGURE 5. ESTIMATED PERCENTAGE OF URBAN POPULATION EXPOSED TO OUTDOOR DAY-NIGHT SOUND LEVELS DUE TO TRAFFIC

It is useful to know the number of people living in areas characterized by different levels of environmental noise. Figure 6 presents estimates for urban traffic, freeway traffic, and aircraft noise. The figure shows that urban traffic noise is much more widespread than either aircraft or freeway noise, but the figures are not strictly additive, because many of the people counted in one category are also exposed to another category of noise. Fifty-nine million people live in areas with urban traffic noise of $L_{dn} = 60$ dB or higher, in contrast to only 16 million and 3.1 million people who live in areas with outdoor levels of $L_{dn} = 60$ dB or higher for aircraft and freeway noise, respectively. On the other hand, more people are exposed to higher levels of noise from freeway and aircraft operations than from urban traffic: about 300,000 people live in areas exposed to levels of $L_{dn} = 80$ dB or higher from freeway traffic; 200,000 from aircraft operations; and 100,000 from urban traffic. Bear in mind, however, that there may be differences between individual at-ear exposure levels and outdoor levels, because people move from place to place for varying amounts of time.

Relationship Between Indoor and Outdoor Levels

The contribution of outdoor noise to indoor noise levels is usually small. That part of a sound level within a building caused by an outdoor source obviously depends on the source's intensity and the sound level reduction afforded by the building. Although the sound level reduction provided by different buildings differs greatly, dwellings can be categorized into two broad classes—those built in warm climates and those built in cold climates. Further, the sound level reduction of a building is largely determined by whether its windows are open or closed. Table II shows typical sound level reductions for these categories of buildings and window conditions, as well as an approximate national average sound level reduction.

Table II
Typical Sound Level Reductions of Buildings

	Windows Opened	Windows Closed
Warm Climate	12 dB	24 dB
Cold Climate	17 dB	27 dB
Approximate National Average	15 dB	25 dB

Sample measurements of outdoor and indoor noise levels during 24-hour periods are depicted in Figure 7. Despite the sound level reduction of buildings, indoor levels are often comparable to or higher than levels measured outside. Thus, indoor levels often are influenced primarily by internal noise sources such as appliances, radio and television, heating and ventilating equipment, and people. However, many outdoor noises may still annoy people in their homes more than indoor noises do. Indeed, people sometimes turn on indoor sources to mask the noise coming from outdoors.

An example of the range of hourly sound levels measured inside living areas is plotted for each hour of the day in Figure 8. The figure shows the median levels and the range of levels observed for 80% of the data. During late night hours the typical hourly sound level was approximately 36 dB. This level was probably dominated by outdoor noise. However, during the day, the hourly average levels ranged from about 40 to 70 dB, indicating the wide range of activities in which people engage.

INDIVIDUAL NOISE EXPOSURE PATTERNS

During a 24-hour period, people are exposed to a wide range of noises, including noise at home, work, school, places of recreation, shopping establishments, and while enroute to these or other locations. Clearly, no single exposure pattern can be typical of all people, or even of those people who follow a common life style. Figure 9 shows hypothetical exposure patterns for broad classes of people. From these levels and some assumptions about the hours spent at different daytime activities, 24-hour average sound levels can be estimated for factory and office workers, housewives, and preschool and school-age children. Estimates based on these assumptions are found in Table III.

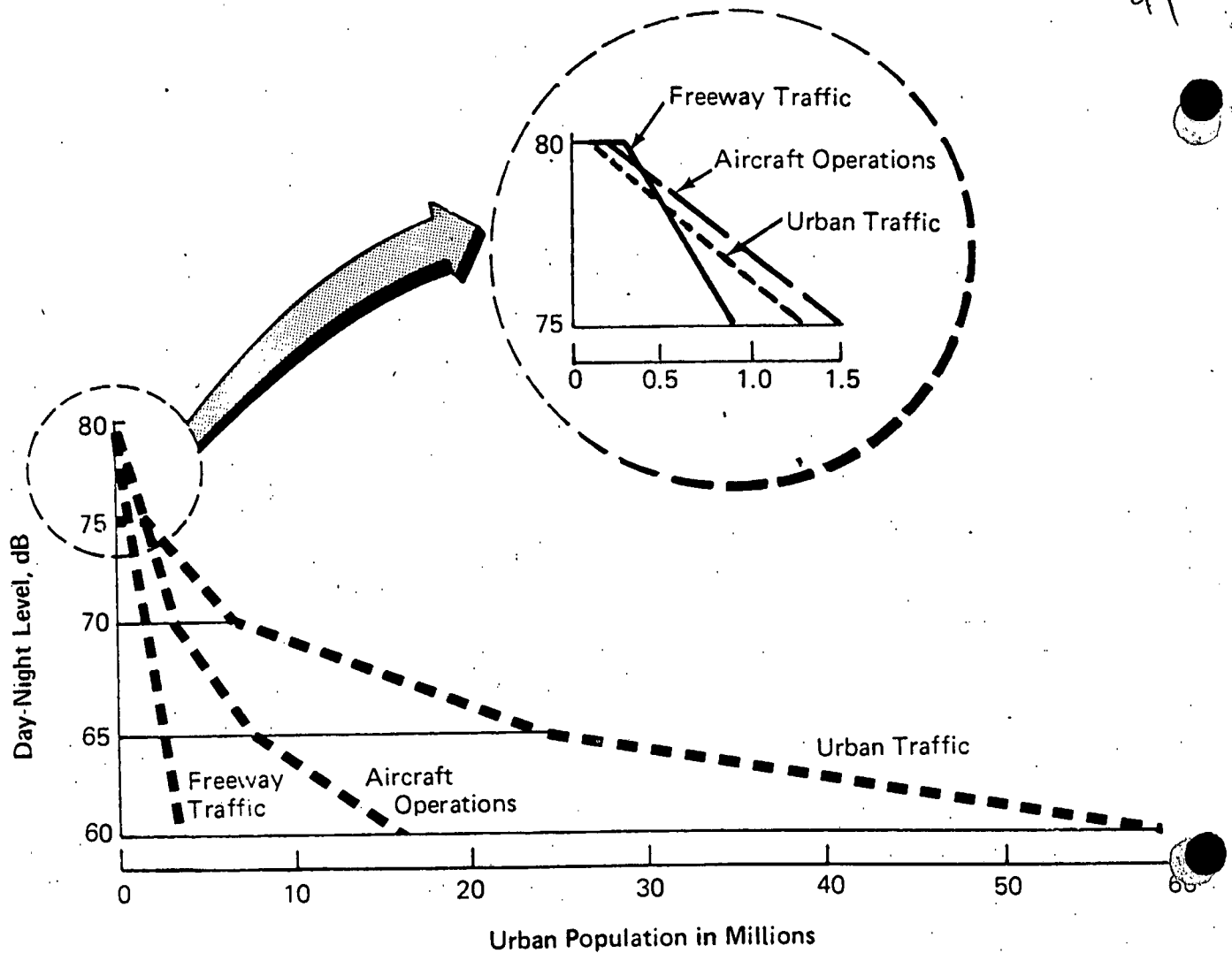


FIGURE 6. CUMULATIVE NUMBER OF PEOPLE IN URBAN AREAS EXPOSED TO OUTDOOR DAY-NIGHT AVERAGE SOUND LEVELS FROM DIFFERENT SOURCES

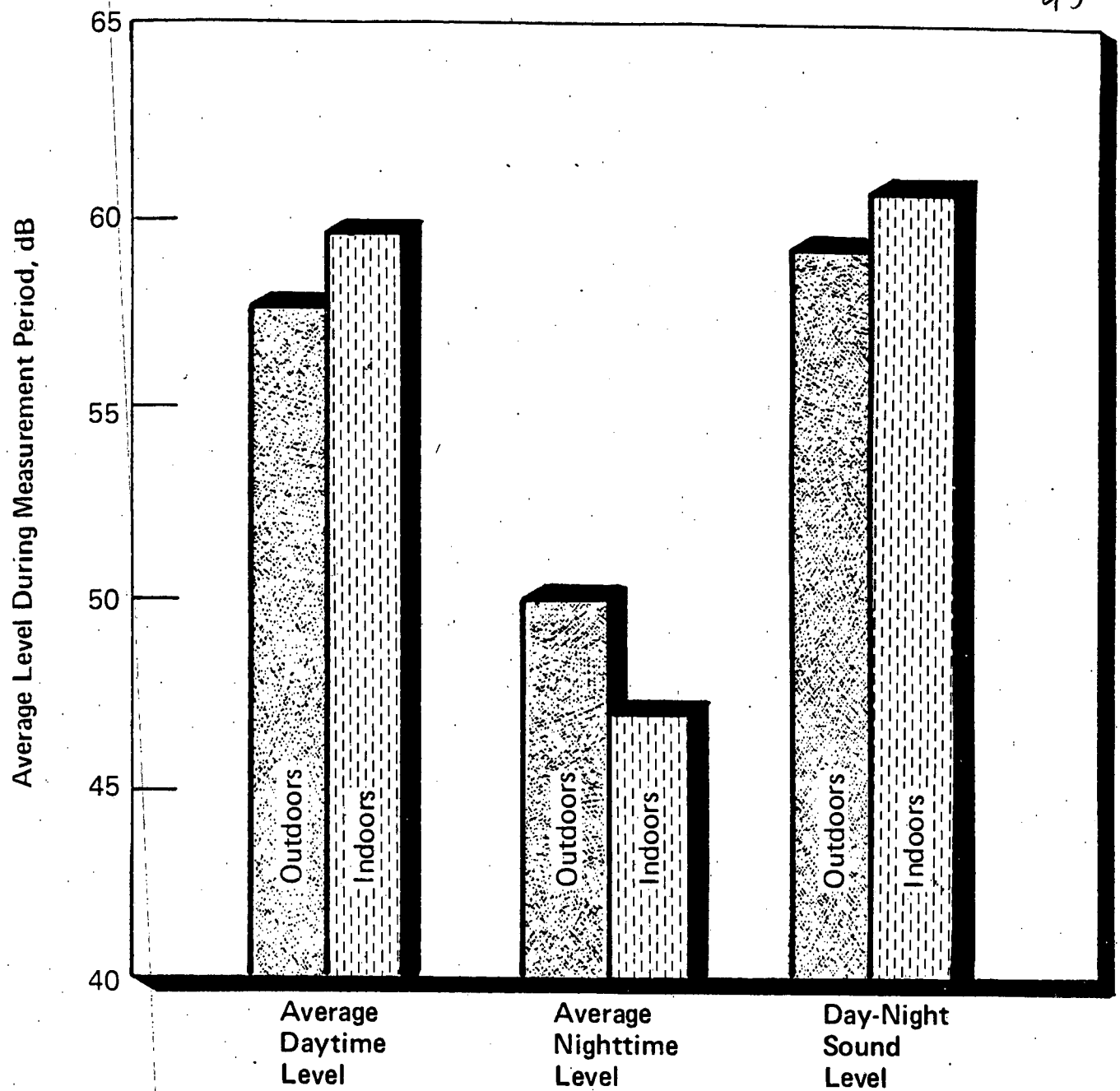


FIGURE 7. COMPARISON OF SAMPLE OUTDOOR AND INDOOR AVERAGE RESIDENTIAL SOUND LEVELS

46

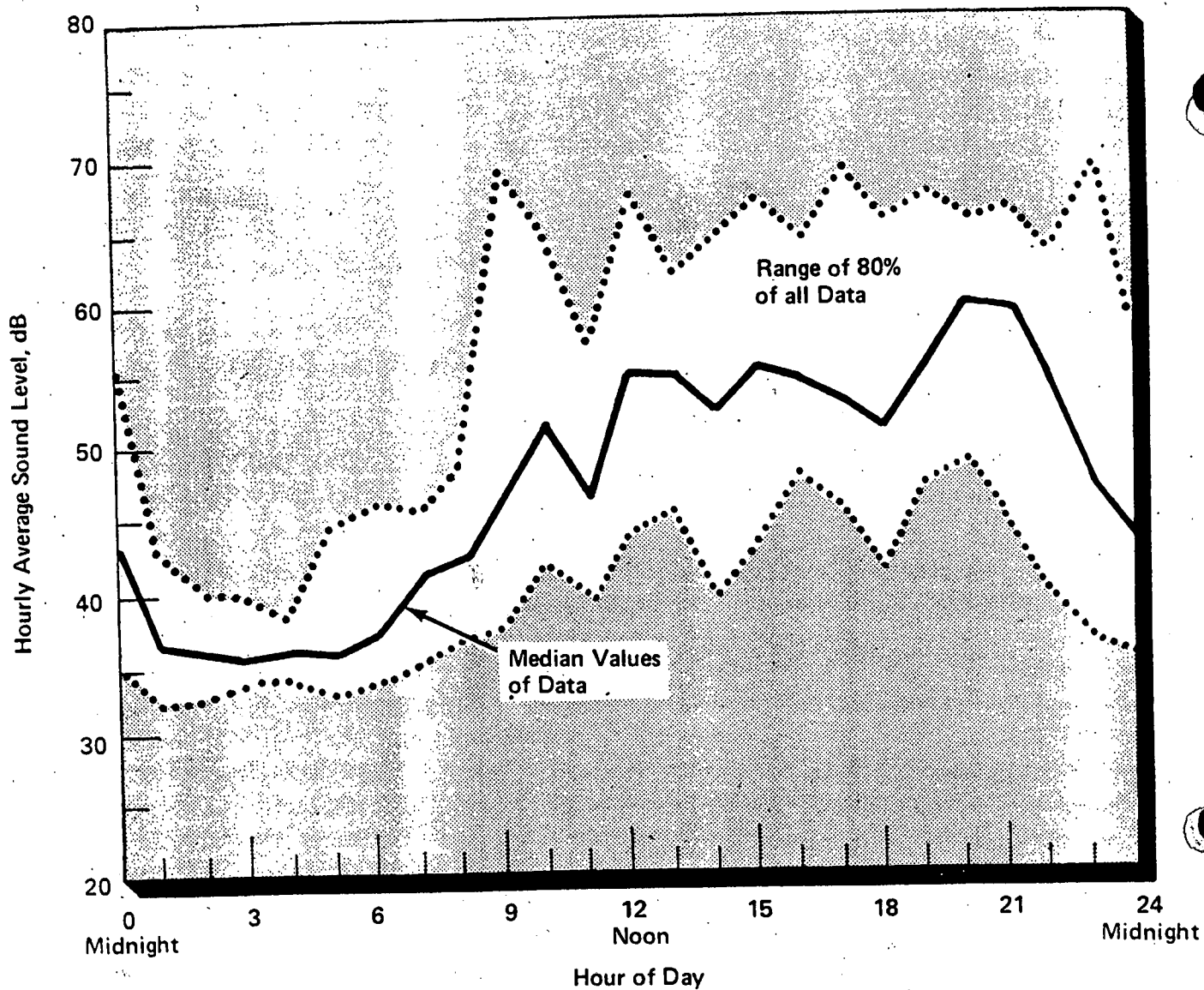


FIGURE 8. TIME PATTERN OF HOURLY INDOOR RESIDENTIAL SOUND LEVELS

47

For most people, nighttime noises do not contribute significantly to the 24-hour average. For many, the 24-hour average is determined primarily by the noise exposure of a single activity, frequently occurring for a short period of time.

Table III
Hypothetical Examples of Noise Exposures of Individuals

Individual	24-Hour Average Sound Level, dB	
	Suburban Environment	Urban Environment
Factory Worker	87	87
Office Worker	72	70
Housewife	64	67
School Child	77	77

HEARING DAMAGE FROM ENVIRONMENTAL NOISE

There is no question that exposure to certain levels of noise can damage hearing. However, determining exposure levels that protect hearing with an adequate margin of safety is a complicated matter.

This is because hearing is a complex ability that cannot be summarized by a single number in the way an individual's height or weight can be described. In fact, sizeable differences exist between individuals' hearing abilities. Hearing acuity tends to change progressively with age. Also, environmental noise exposure may vary considerably from moment to moment, so that specification of protective levels should include dynamic considerations. Further, relationships between hearing damage and noise exposure must be inferred, since available scientific information was gathered from groups of people who differed not only in noise exposure, but also in other important ways. Finally, individual and group noise exposures (especially over a working lifetime) are rarely known with precision.

In reaching conclusions about hearing loss, then, one must rely to a degree on assumptions, hypotheses, and extrapolations from existing data. Since complete agreement within the scientific community on these matters is lacking, an attempt was made in the Levels Document to consider alternative assumptions and hypotheses to ensure that the methods used to derive protective levels were based on the most defensible practice. As new data become available these levels may change slightly.

Basic Premises Involved in Determining Protective Levels

1. Changes in ability to hear in the region of 4000 Hz are the most important signs of irreversible hearing loss, indicating actual physiological destruction within the hearing mechanism. This frequency is usually the first frequency affected when the ear is damaged by exposure to noise. Furthermore, the protection of hearing acuity at this frequency is critical for understanding of speech and appreciation of music and other sounds.
2. Changes in individual hearing level, like changes in height or weight, are only significant if they are sizeable. Changes smaller than 5 dB are considered insignificant.
3. At all ages, it is assumed that hearing acuity cannot be damaged by sounds that cannot be heard. This may be important in that aging and other causes may produce appreciable shifts in hearing.
4. Because hearing ability varies from person to person, recommendations must be made in terms of a critical percentage of the population, ranked with superior hearing over the remainder. EPA's recommendations were based on the 96th percentile—that is, on providing protection for 96% of the people. It is assumed that people with poorer hearing than the 96th percentile are not affected by noise of typical levels (see 3 above), so that the recommendations protect virtually the entire population.
5. An individual's total noise exposure is evaluated by an "equal energy" rule: two noise exposures are expected to produce equal hearing loss if the product of exposure intensity and exposure time are equal. This rule allows a 3-dB decrease in sound pressure level (expressed in dB) for each doubling of the duration. Thus an exposure of 76 dB for one hour is equivalent to 73 dB for two hours, or 70 dB for four hours. This procedure is probably accurate for exposures of 30 minutes or more. It is also more protective for very short exposures and for noise that fluctuates greatly in level.

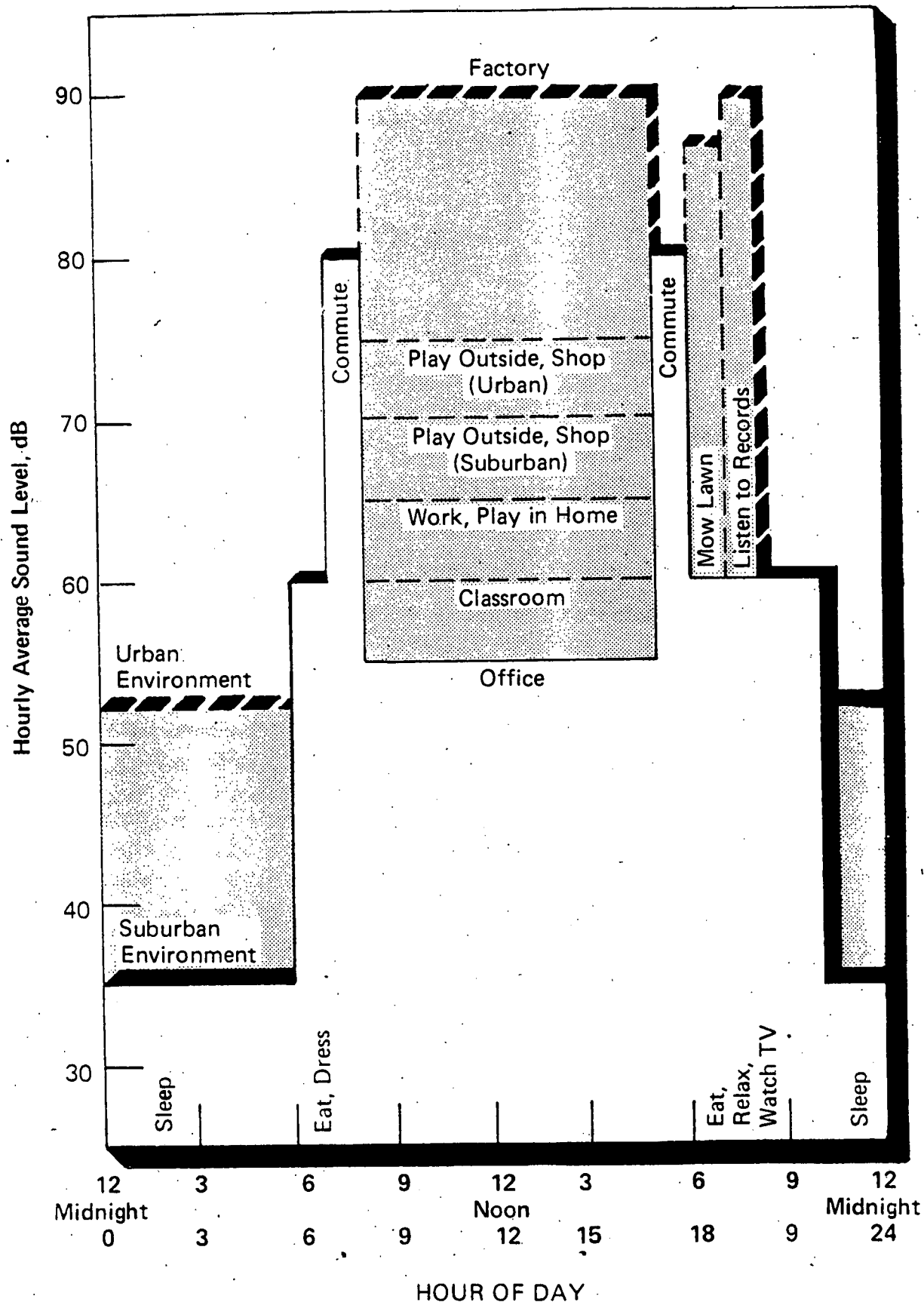


FIGURE 9. GENERALIZED INDIVIDUAL NOISE EXPOSURE PATTERNS

6. Intermittent noise produces less hearing damage than the "equal energy" rule would predict. To be considered intermittent for this purpose, a noise must fall below 65 dB for 10% of each hour and have peaks that exceed the background level by 5 to 15 dB. Intermittent noise is assumed to produce 5 dB less effect than does continuous noise of the same average level. 49

Calculation of the Maximum Allowable Noise Exposure

Three major scientific studies have attempted to assess hearing damage for various noise exposures. All are based on a comparison of groups of noise-exposed people and comparable non-exposed groups. All three studies attempted to predict hearing loss as a function of noise exposure of a certain percentage of people. Because these studies were of exposure to high-level noise, extrapolations of the data were necessary to estimate the protective exposure level that would produce minimal hearing loss: less than 5 dB at 4000 Hz for 96% of the people.

Forty years of exposure (250 working days per year) to a noise level of 73 dB for 8 hours per day was calculated to produce a hearing loss smaller than 5 dB for 96% of the people. This is the basic datum used to calculate hearing-protective levels of noise exposure. To use it in specific situations, certain corrections must be applied. One correction is to determine the yearly (rather than working day) level (250 to 365 days). This consideration amounts to a reduction 1.6 dB. Another correction, based on exposure on a 24-hour rather than 8-hour basis, produces an additional reduction of 5 dB.

Table IV contains at-ear noise exposure levels that produce negligible hearing losses for both 8-hour and 24-hour exposure on a yearly and working day basis. The 8-hour calculation assumes the remaining 16 hours of the day are spent in relative quiet.

Since an individual often experiences intense noise exposure outside of working hours (for example, while using noisy appliances or pursuing noisy recreation), protection on a 24-hour basis 365 days per year requires exposure of an intermittent variety at an equivalent level of less than 71.4 dB. This value is rounded to 70 dB to provide a slight margin of safety. Exposure to greater levels would produce more than 5 dB hearing loss in at least some of the population.

Table IV
(At-Ear) Exposure Levels that Produce No More Than
5 dB Noise-Induced Hearing Damage Over a 40-Year Period

		Steady (Continuous) Noise	Intermittent Noise	With Margin of Safety
Leq, 8 hour	250 day/year	73	78	75
	365 day/year	71.4	76.4	
Leq, 24 hour	250 day/year	68	73	70
	365 day/year	66.4	71.4	

Discussion of Assumptions

Several assumptions have been made in calculating the 24-hour yearly hearing-protective level of 70 dB. It is reasonable to ask how alternative assumptions would affect this level, and what the range of error might be.

- Q. How would the recommended level be affected by a change in the percentage of the population protected?
- A. Reducing the 96th percentile value to the 50th percentile (i.e., protecting half the population) would increase the protective level value from 70 dB to 77 dB.
- Q. Since agreement on the value of the intermittency correction is imperfect, what other values might be used?
- A. The estimated intermittency correction used in the Levels Document is 5 dB. The true intermittency correction is probably within the range 0 to 15 dB.
- Q. How accurate is the equal energy assumption?
- A. The equal energy assumption when applied to the long times (8 hours to 24, or 250 to 365 days) is fairly accurate. It may be subject to error when applied to short exposures of extreme level.

50
Q. How meaningful are the basic studies of hearing damage risk?

A. The probable errors of estimates in the three basic studies cannot be stated with absolute accuracy. There are a number of problems in extrapolating percentages of the population damaged from relatively high exposure levels to the protective level. Also, there is the problem of determining the amount of hearing damage when the control (non-exposed) population is subject to high levels of non-occupational noise. Thus, the 70 dB protective level is simply the best present estimate, subject to change if better data become available.

SPEECH COMMUNICATION

Communication is an essential element of human society, and speech is its most convenient form of expression. Interference with speech can degrade living directly, by disturbing normal social and work-related activities, and indirectly, by causing annoyance and stress. Sometimes the communications disturbed by noise are of vital importance, such as warning signals or cries for assistance. Prolonged speech interference and resulting annoyance are clearly not consistent with public health and welfare.

Speech interference from environmental noise can occur at home, at work, during recreation, inside vehicles, and in many other settings. Of chief concern for current purposes are the effects of noise on face-to-face conversations (indoors and outdoors), telephone conversations, and radio or television use.

The degree to which noise disturbs speech depends not only on physical factors (such as noise levels, vocal effort, distances between talkers and listeners, and room acoustics), but also on non-physical factors. The latter include the speaker's enunciation, the familiarity of the listener with the speaker's vocabulary and accent, the topic of conversation, the listener's motivation, and the hearing acuity of the listener. Years of research on speech intelligibility have produced considerable information about how these factors interact. Accurate predictions of speech intelligibility can be based on average noise levels and distances between speakers and listeners.

Speech Interference Indoors

The solid line in Figure 10 shows the effects of steady masking noise on sentence intelligibility for persons with normal hearing in a typical living room. At distances greater than about one meter from the speaker, the level of speech is fairly constant throughout the room.

The highest noise level that permits relaxed conversation with 100% sentence intelligibility throughout the room is 45 dB. People tend to raise their voices when the background noise exceeds 45-50 dB.

Speech Interference Outdoors

The sound level of speech outdoors decreases with increasing distance between speaker and listener. Table V shows distances between speaker and listener for satisfactory outdoor speech intelligibility at two levels of vocal effort in steady background noise levels.

The levels for normal and raised-voice "satisfactory conversation" shown in Table V permit sentence intelligibility of 95% at each distance. Ninety-five percent sentence intelligibility usually permits reliable communication because of the redundancy in normal conversation.

If the noise levels in Table V are exceeded, the speaker and listener must either move closer together or expect reduced intelligibility. For example, consider a conversation at normal vocal effort at a distance of three meters in a steady background noise of 56 dB. If the background level increases to 66 dB, the speakers either will have to move closer (to one meter apart) to maintain the same intelligibility, or alternatively, raise their voices appreciably. If they remain three meters apart without raising their voices, speech intelligibility would drop considerably.

Table V
Steady A-weighted Sound Levels That Allow Communication with
95 Percent Sentence Intelligibility Over Various Distances
Outdoors for Different Voice Levels

VOICE LEVEL	COMMUNICATION DISTANCE (meters)					
	0.5	1	2	3	4	5
Normal Voice (dB)	72	66	60	56	54	52
Raised Voice (dB)	78	72	66	62	60	58

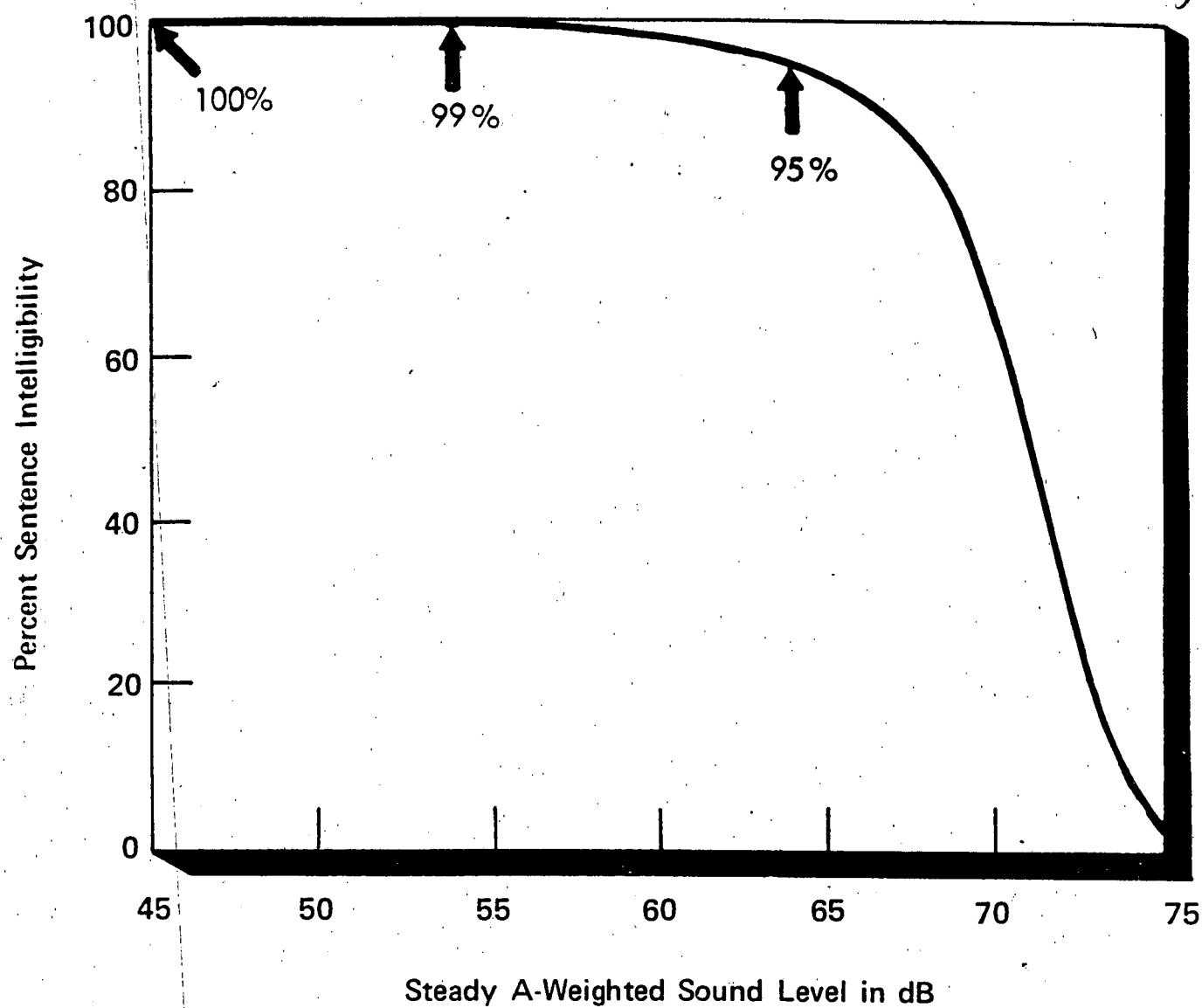


FIGURE 10. INDOOR SENTENCE INTELLIGIBILITY

52

Discussion

In summary, an L_{dn} of 45 dB permits virtually 100% intelligibility inside buildings. Assuming that a typical home reduces outdoor noise by 15 dB, the outdoor noise level should be no greater than $L_{dn} = 60$ dB to permit 100% intelligible speech indoors. Allowing a 5 dB margin of safety, the outdoor level should be $L_{dn} = 55$ dB. This outdoor level would also guarantee sentence intelligibility of 95% outdoors with normal voice levels at a distance of three meters.

Q: What do percentages of sentence intelligibility signify?

A: A given percentage of sentence intelligibility, such as 95% or 99%, indicates the proportion of key words (in a group of sentences) which are correctly heard by normal-hearing listeners.

Q: How are the speech criteria affected by the fact that people tend to raise their voices in noise?

A: The speech criteria are based on the principle that an adequate communication environment does not necessitate raised voices.

Q: How do the identified continuous equivalent levels relate to the fact that, in everyday life, noise fluctuates and is intermittent in nature?

A: The Levels Document tabulated speech interferences for different combinations of levels and durations to test the limits of certain L_{eq} values under intermittent conditions. It is acknowledged that, given equal L_{eq} values, fluctuating noise may reduce less total speech interference than continuous noise on average. On the other hand, during those times when the higher level noises occur, the speech interference will be greater than its average value.

ACTIVITY INTERFERENCE AND ANNOYANCE

Noise interferes with human activities to varying degrees. Intruding noises can interfere with human activities by distracting attention and by making activities more difficult to perform, especially when concentration is needed. Interference from noise can even make some activities (such as communication or sleep) virtually impossible. Except in the case of speech interference, however, the degree of interference is hard to specify and difficult to relate to the level of noise exposure.

Because people's reactions to time-varying noise differ from moment to moment, and because people's reactions differ in general, protective levels for annoyance and activity interference are determined from data collected from groups of people, rather than from individuals. Fortunately, considerable data from social surveys of community reactions to noise exposure are available for this purpose. Although there are some shortcomings in practically all such data, sufficient agreement exists to allow confident predictions of the noise levels that lead to certain degrees of activity interference and annoyance.

*Activity Interference

Social surveys most often have been used to assess community reaction to noise exposure around airports. Table VI shows the percentage of people who reported noise interference with activities among a larger group which was extremely disturbed by aircraft noise.

It is hardly surprising that four of the nine activities in Table VI involve listening. Aircraft noise may also be found annoying because it may startle people, cause houses to shake, or elicit fear of a crash.

Another widely studied source of community noise exposure is vehicular traffic. Activity interference produced by traffic noise closely resembles that of aircraft noise, since interference with conversation, radio, television, and telephone use are all high on the list of activities disturbed.

Table VI
Percentage of Those People Who Were Highly
Disturbed by Aircraft Noise, by Activity Disturbed

ACTIVITY	PERCENT
TV-Radio Reception	20.6
Conversation	14.5
Telephone	13.8
Relaxing Outside	12.5
Relaxing Inside	10.7
Listening to Records/Tapes	9.1
Sleep	7.7
Reading	6.3
Eating	3.5

Community Reactions to Noise

Two major indices of the cumulative effects of environmental noise on people are (A) specific actions taken by individuals or groups (such as complaints), and (B) responses to social survey questionnaires. Over the last 25 years, numerous studies have been conducted to increase understanding of the relationship between noise exposure and its effects on people in communities.

Several factors beyond the magnitude of exposure have been found to influence community reaction. These factors include:

1. Duration of intruding noises and frequency of occurrence
2. Time of year (windows open or closed)
3. Time of day of noise exposure
4. Outdoor noise level in community when intruding noises are not present
5. History of prior exposure to the noise source
6. Attitude toward the noise source
7. Presence of pure tones or impulses.

Since each of these factors may affect community reactions to noise exposure, adjustments for each have been developed to improve the predictability of community reactions beyond that available from a simple measure of exposure level. Figure 11 shows the results of several different case studies, relating L_{dn} (in dB) to community response with various correction factors added. The addition of the correction factors makes it possible to predict community reaction to within ± 5 dB. As is common with annoyance and interference caused by noise, the effects of context and situation may be almost as important as the magnitude or intensity of the source. Caution is also needed in applying these relationships to communities that are significantly quieter than average urban areas.

Social Surveys

Extensive social surveys have been conducted around Heathrow Airport near London and at eight major airports in the United States. The relationship found in these surveys between noise exposure levels and the percentage of respondents who were considered annoyed by noise is summarized in Figure 12.

Discussion

- Q. Is annoyance simply a "welfare" effect?
- A. Annoyance is a reflection of adverse effects which cannot be ascribed solely to "health" or "welfare." "Public health and welfare" in the context of the Noise Control Act is an indivisible term; there are no separate "health" effects or "welfare" effects. "Public health and welfare" includes personal comfort and well-being, and the absence of mental anguish, disturbances and annoyance as well as the absence of clinical symptoms such as hearing loss or demonstrable physiological injury.
- Q. What is annoyance due to noise?
- A. Noise annoyance may be viewed as any negative subjective reaction to noise on the part of an individual or group. It is not an indication of weakness or inability to cope with stress on the part of the annoyed. More likely it signifies transient (or possibly lasting) stress beyond the control of the conscious individual. This is often expressed on social surveys as the percentage of people who express differing degrees of disturbance or dissatisfaction due to the noisiness of their environments. For the purpose of identifying protective noise levels, annoyance is quantified by using the percentage of people who are annoyed by noise. This is felt to be the best estimate of the average general adverse response of people, and in turn, is viewed as reflecting activity interference and the overall desire for quiet.
- Q. Are people annoyed at levels below an L_{dn} of 45 or 55 dB?
- A. Individuals, or even groups, may be annoyed by noise at low levels—the dripping faucet or humming fluorescent bulb are good examples. Annoyance depends very much on the situation, and on individual differences and noise durations.
- Q. What do complaints represent?
- A. Complaints are used by officials as an indication that a noise problem exists (although a noise problem may well exist in the absence of specific complaints). However, they do not necessarily represent the magnitude of a noise problem. The number of people who file complaints is only a very small percentage of those who are annoyed.

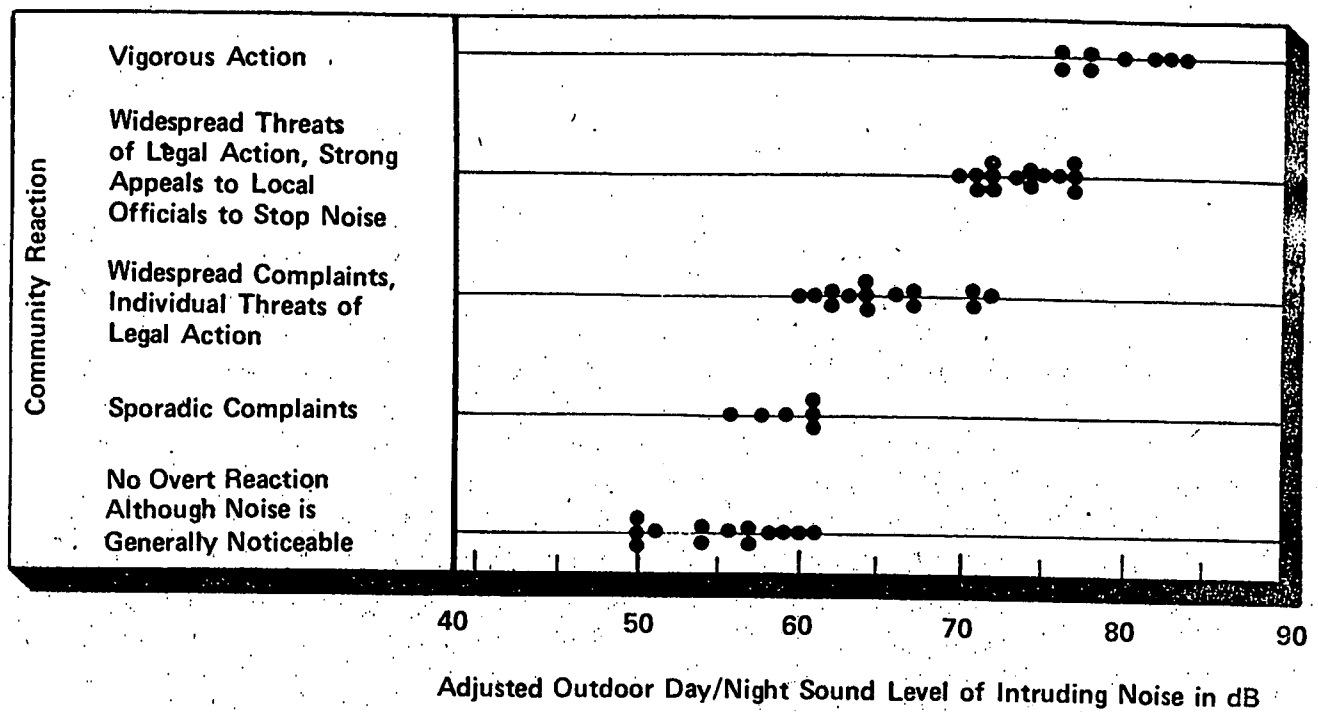


FIGURE 11. COMBINED DATA FROM COMMUNITY CASE STUDIES ADJUSTED FOR CONDITIONS OF EXPOSURE

Percent of Community Annoyed by Noise Exposure

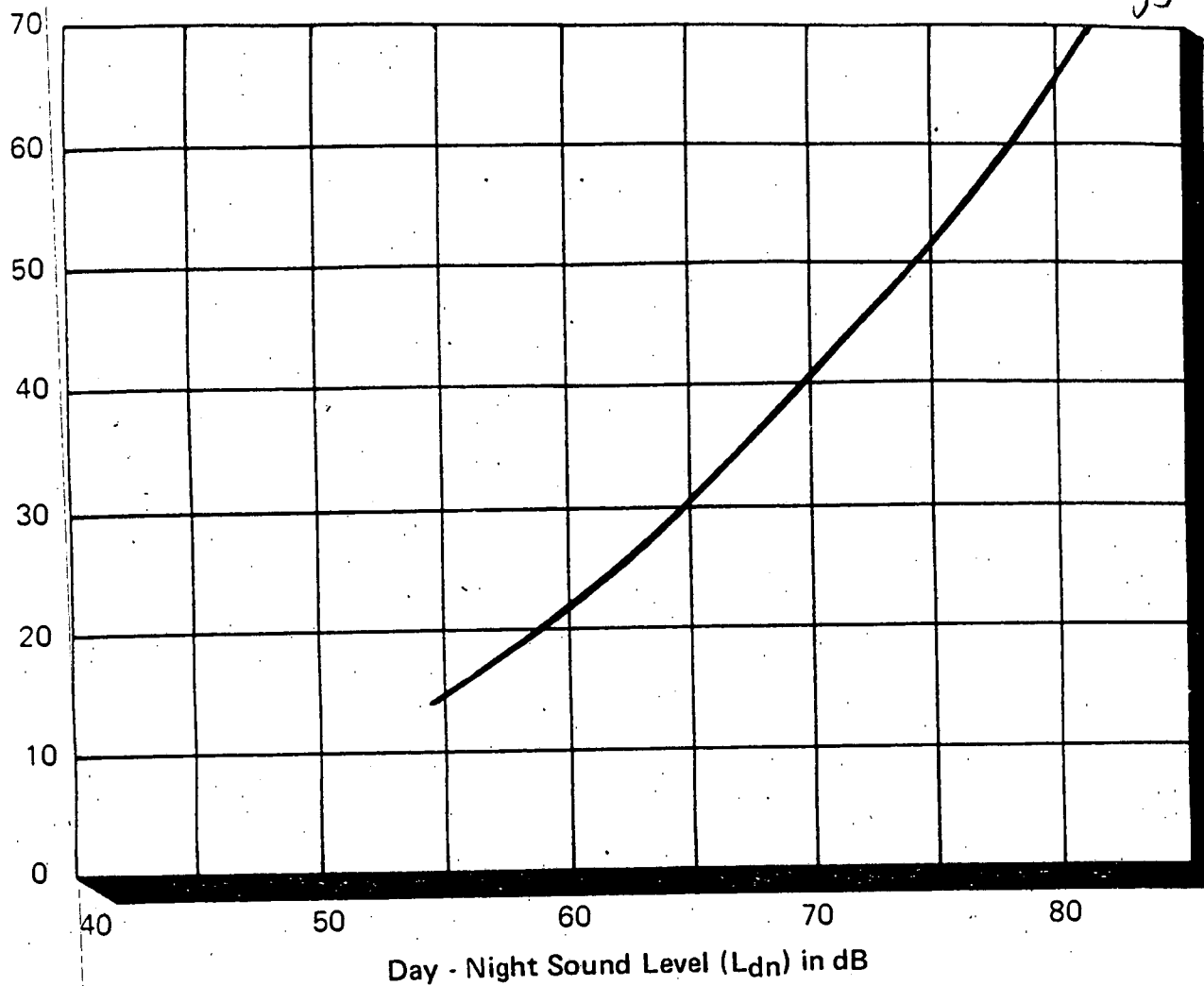


FIGURE 12. PERCENTAGE OF POPULATION ANNOYED BY COMMUNITY NOISE (HEATHROW AIRPORT STUDY)

- 56
- Q. How is the margin of safety for annoyance applied?
- A. The identified indoor level of $L_{dn} = 45$ incorporates a margin of safety for 100% protection of speech perception which is used as a surrogate for annoyance. The outdoor identified level of 55 L_{dn} protects speech outdoors to a level of 95% intelligibility at up to 2 meters, while incorporating a 5 dB margin of safety for speech, and giving added weight to the range of adverse effects.
- Q. Why is the nighttime penalty 10 decibels?
- A. The 10 dB nighttime weighting had two bases: first, this weighting value has been applied successfully here and in other countries; secondly, in quiet environments, the natural drop in level from day to night is about 10 dB.

SUMMARY

On the basis of its interpretation of available scientific information, EPA has identified a range of yearly Day-Night Sound Levels sufficient to protect public health and welfare from the effects of environmental noise. It is very important that these noise levels, summarized in Table VIII, not be misconstrued. Since the protective levels were derived without concern for technical or economic feasibility, and contain a margin of safety to insure their protective value, they must not be viewed as standards, criteria, regulations, or goals. Rather, they should be viewed as levels below which there is no reason to suspect that the general population will be at risk from any of the identified effects of noise.

Table VIII
Yearly L_{dn} Values That Protect Public Health
and Welfare with a Margin of Safety

EFFECT	LEVEL	AREA
Hearing	$L_{eq}(24) \leq 70$ dB	All areas (at the ear)
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq}(24) \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \leq 45$ dB	Indoor residential areas
	$L_{eq}(24) \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

Outdoor yearly levels on the L_{dn} scale are sufficient to protect public health and welfare if they do not exceed 55 dB in sensitive areas (residences, schools, and hospitals). Inside buildings, yearly levels on the L_{dn} scale are sufficient to protect public health and welfare if they do not exceed 45 dB. Maintaining 55 L_{dn} outdoors should ensure adequate protection for indoor living. To protect against hearing damage, one's 24-hour noise exposure at the ear should not exceed 70 dB.

MISUSES, MISUNDERSTANDINGS, AND QUESTIONS

Perhaps the most fundamental misuse of the Levels Document is treatment of the identified levels as regulatory goals. They are *not* regulatory goals; they are levels defined by a negotiated scientific consensus. These levels were developed without concern for economic and technological feasibility, are intentionally conservative to protect the most sensitive portion of the American population, and include an additional margin of safety. In short, the levels in Table VIII are neither more nor less than what Congress re-

quired them to be: levels of environmental noise requisite to protect the public health and welfare with an adequate margin of safety.

- Q. Why doesn't the Levels Document explicitly say how much noise is too much noise?
- A. Decisions about how much noise is too much noise for whom, for how long, and under what conditions demand consideration of economic, political, and technological matters far beyond the intent of the Levels Document. Such decisions are properly embodied in formal regulations, not informational publications such as the Levels Document.
- Q. How do I use this information for local purposes?
- A. This question reflects the need to reconcile local economic and political realities with scientific information. People who formulate local noise abatement programs cannot escape the responsibility of making such economic and political compromises for their constituencies. The Levels Document does not impose arbitrary Federal decisions about the appropriateness of noise environments upon any level of government, nor is it a source of prescriptions for solving local noise problems. It is best viewed as a technical aid to local decision makers who seek to balance scientific information about effects of noise on people with other considerations, such as cost and technical feasibility.
- Q. If the identified noise levels are indeed sufficient to protect public health and welfare, shouldn't they be considered to be long-range regulatory goals?
- A. Attainment of the identified levels of environmental noise can only be considered idealized goals. Pragmatically, it is unlikely that local, state, or Federal regulatory strategies will seek to attain such levels for all situations in the near future.
- Q. Why isn't the Levels Document more definite about specific effects associated with various noise exposure conditions?
- A. Available knowledge about the effects of noise would not support more precise statements. Increasingly specific statements will be incorporated in future informational publications as they are justified by increasing knowledge of human response to noise exposure.

58

TECHNICAL REPORT DATA <i>(Please read Instructions on the reverse before completing)</i>		
1. REPORT NO. EPA 550/9-79-100	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Protective Noise Levels Condensed Version of EPA Levels Document	5. REPORT DATE November 1978	6. PERFORMING ORGANIZATION CODE ONAC
7. AUTHOR(S) EPA Office of Scientific Assistant to DAA/Noise	8. PERFORMING ORGANIZATION REPORT NO.	
9. PERFORMING ORGANIZATION NAME AND ADDRESS EPA/ONAC	10. PROGRAM ELEMENT NO.	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Environmental Protection Agency Office of Noise Abatement & Control (ANR-471) 401 M Street, S.W. Washington, D.C. 20460	13. TYPE OF REPORT AND PERIOD COVERED	
	14. SPONSORING AGENCY CODE EPA/ONAC	
15. SUPPLEMENTARY NOTES		
16. ABSTRACT This publication is intended to promote understanding of EPA's findings about levels of environmental noise that protect public health and welfare. It seeks to clarify the proper use of the 1974 "Levels Document" by interpreting its contents in less technical terms. The manual deals with measurement descriptors of environmental noise. Also addressed are the best understood effects of noise on people (hearing damage, speech interference and annoyance). Protective levels are summarized.		
17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Environmental noise levels, indoor and outdoor levels, measurement descriptors, noise exposure patterns, hearing damage, speech interference, annoyance, protective noise exposures		
18. DISTRIBUTION STATEMENT Limited supply available at EPA/ONAC or NTIS, Springfield, VA 22151	19. SECURITY CLASS (This Report) Unclassified	21. NO. OF PAGES 25
	20. SECURITY CLASS (This page)	22. PRICE

January 29, 1976

Page - 2 -

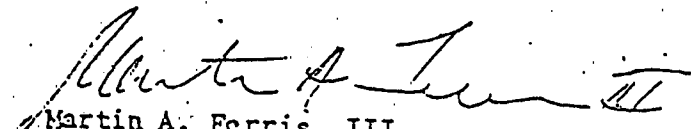
59

This exception was included in the regulation in response to testimony of the Acting Director of the Office of Noise Abatement of the United States Department of Transportation presented at the hearing conducted prior to adoption of the regulation as required by Article 43, Section 828(c). In particular, that portion of his testimony wherein it was stated:

"Sporting events are by their very nature very short in duration, they occur once a week or less, and trying to fit their contribution into the annual average, energy average of noise which the EPA has attempted to identify as a requisite to protect the public health and welfare with an adequate margin of safety, it seems to be rather difficult. In fact, I would say it's rather difficult to the point of impossibility on the State basis to prescribe. I would suggest that parades, sport events and other activities held on public recreational facilities or under the permit issued by appropriate local authorities be included in the list of exemptions, in your Regulations therefore."

Based on the legislative history and the language of the exception, it is our opinion that noise generated by shooting for sport and entertainment at rod and gun clubs on private property is not subject to the sound limits adopted by the Department of Health and Mental Hygiene. The clear intention of the regulation is to allow sporting events of this nature to be controlled by the local jurisdiction wherein they are located.

Sincerely yours,



Martin A. Ferris, III
Special Assistant Attorney General

MAF:dj



THE ATTORNEY GENERAL

1200 ONE CHARLES CENTER

BALTIMORE, MD. 21201

January 29, 1976

Honorable Francis J. Santangelo, Sr.

Delegate

25th Legislative District

Prince George's County

House of Delegates

Annapolis, Maryland 21404

Dear Mr. Santangelo:

Your letter of December 15, 1975 requests an opinion on whether noise created by the shooting activities of a rod and gun club is controlled by regulations of the Department of Health and Mental Hygiene, promulgated pursuant to Article 43, Section 828. This Section of the Annotated Code requires the Department of Health and Mental Hygiene to prepare and adopt environmental noise standards, sound level limits, and regulations for the administration and enforcement of such standards and limits.

Pursuant to this authority the Department adopted 10.03.45, Rules and Regulations Governing the Control of Noise Pollution in the State of Maryland. Subsection .03 of that regulation prohibits noise levels in residential areas which exceed 65 decibels on the A-scale during the day and 60 decibels on the A-scale during the night. Similar limits are provided for industrial and commercial regions. Measurements of sound levels in residential regions adjacent to gun clubs conducted by the Bureau of Air Quality and Noise Control have shown levels above those provided in Subsection .03. However, paragraph J of this Subsection .03, exempts the following:

"Sound not electronically amplified created by sporting, amusement, and entertainment events and other public gatherings operating according to terms and conditions of appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facilities, parades, and public celebrations."

"*exemption for gun clubs*"

DISCUSSION OF SOUND AND VIBRATION FROM APG OPERATIONS AS EXPERIENCED IN EARLEVILLE

(Eastern Shore)

George A. Luz, Ph.D.

Program Manager

Environmental Noise

**U.S. Army Center for Health Promotion
and Preventive Medicine**

**Aberdeen Proving Ground, Maryland
21010-5403**



OBJECTIVES:

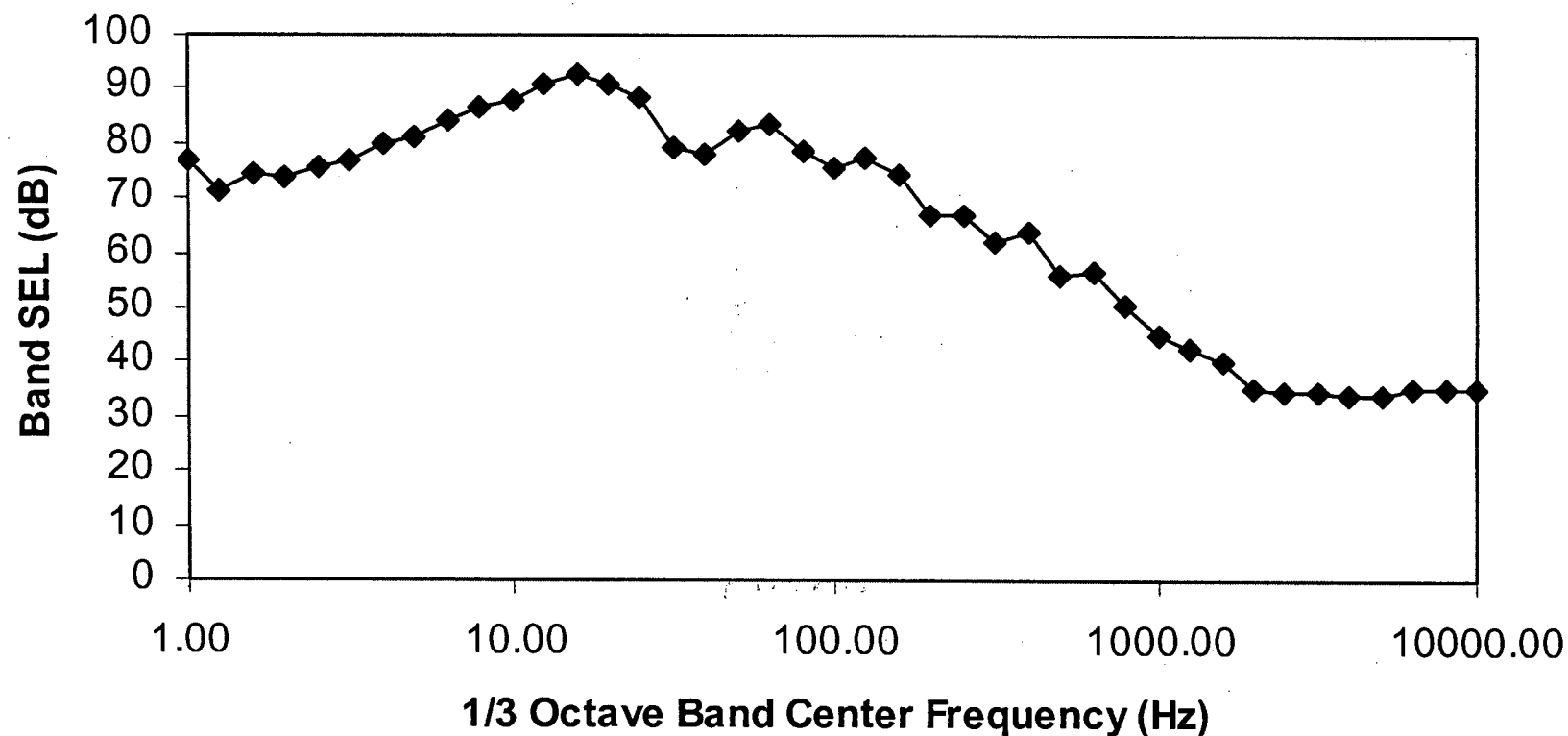
- Explain why residents experience sound-induced house vibrations as coming through the ground.
- Examine the relationship between peak sound pressure level, building vibration and subjective annoyance.
- Examine the reasons for variability in measurable blast noise levels.

Bureau of Mines study - 1989

“ Virtually all measured structure response was produced by airblast rather than ground vibration. Airblasts at McAlester are occasionally strong enough to rattle and shake homes and cause concern that the homes are being adversely affected. Because of the strong weather influence on airblast propagation, these effects will occur irregularly and provide the appearance that the Army is doing ‘something different.’”

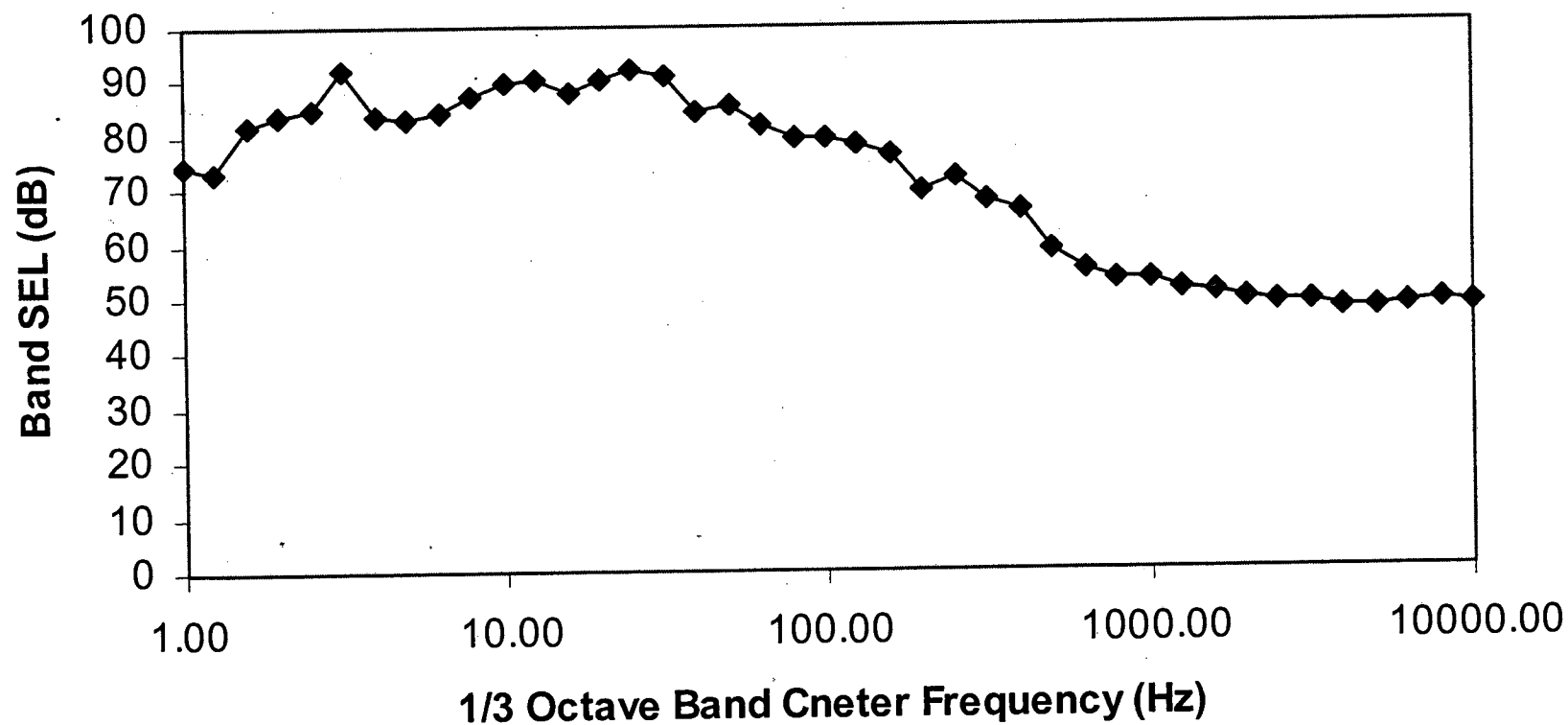
EXPLOSION SPECTRUM (FAR FIELD)

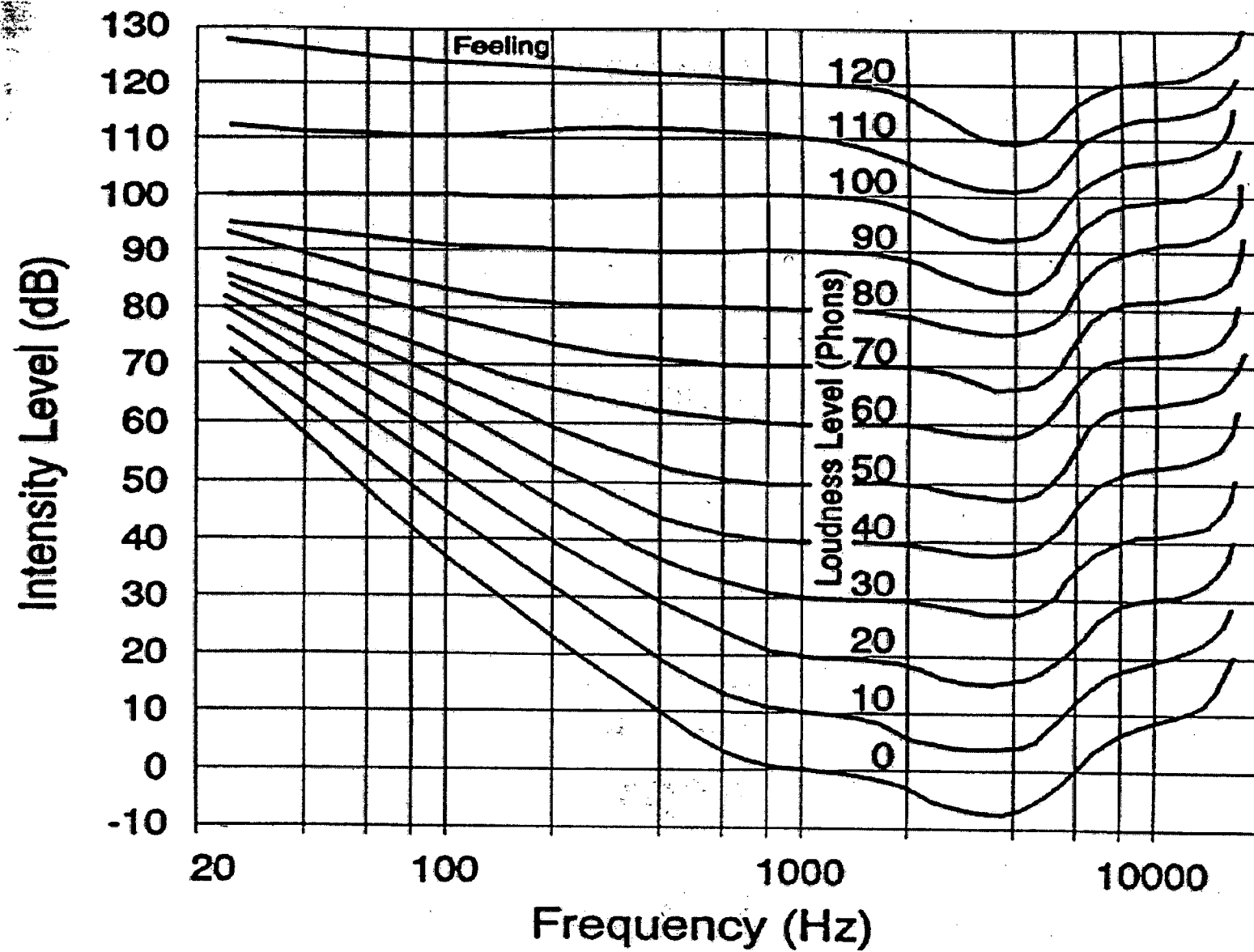
Band SEL for 5 lb. TNT



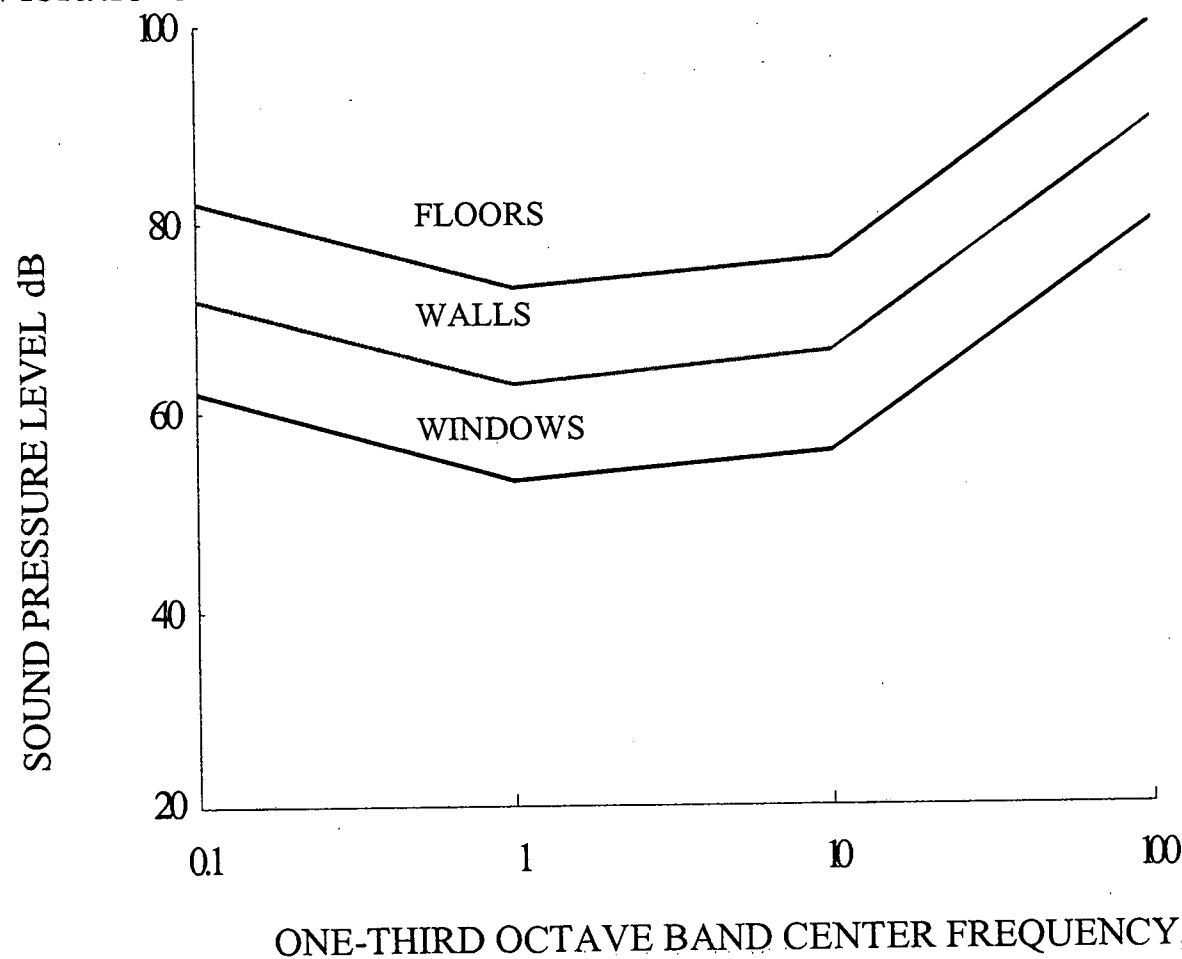
GUN BLAST SPECTRUM (FAR FIELD)

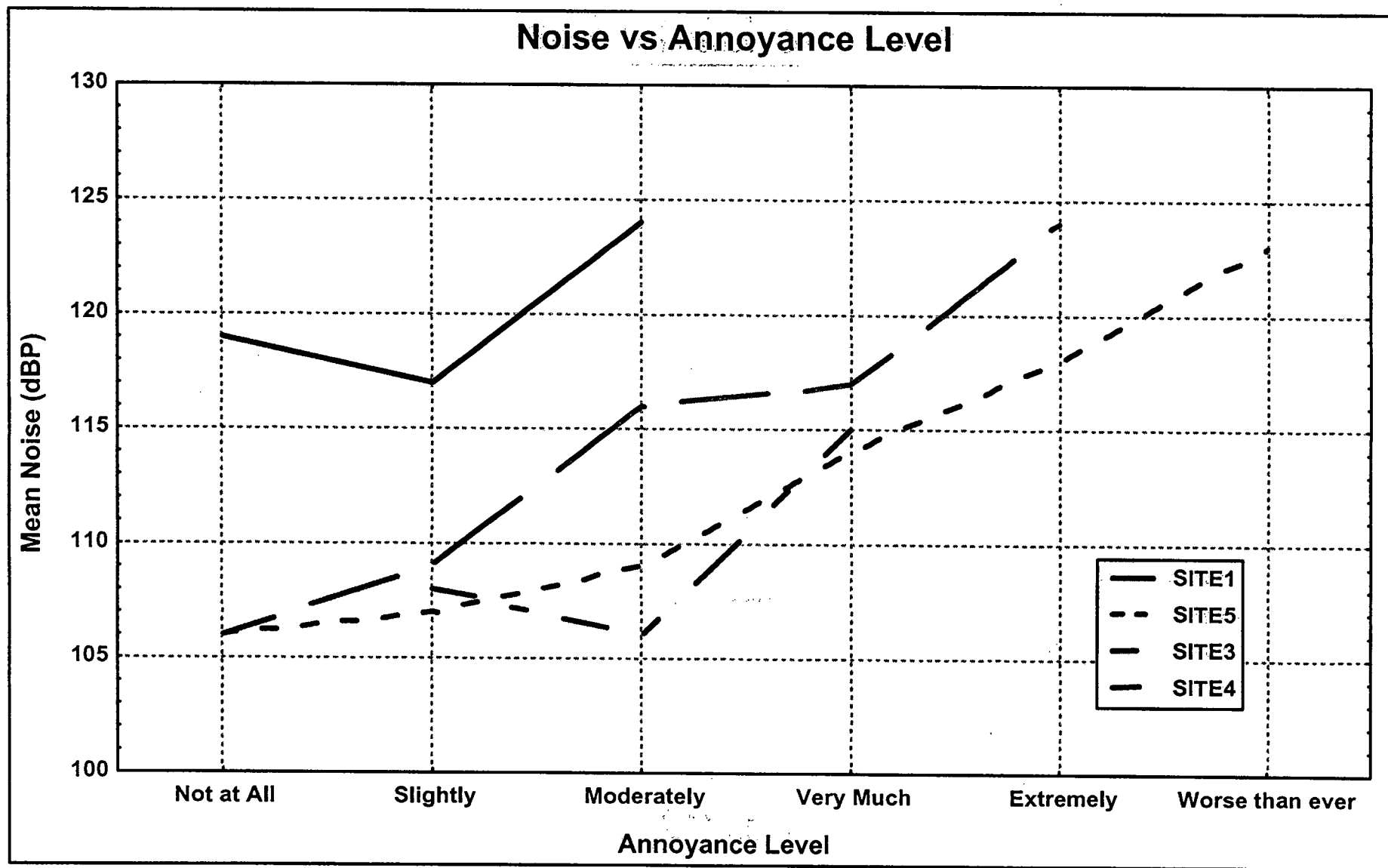
Band SEL for 120 mm Gun



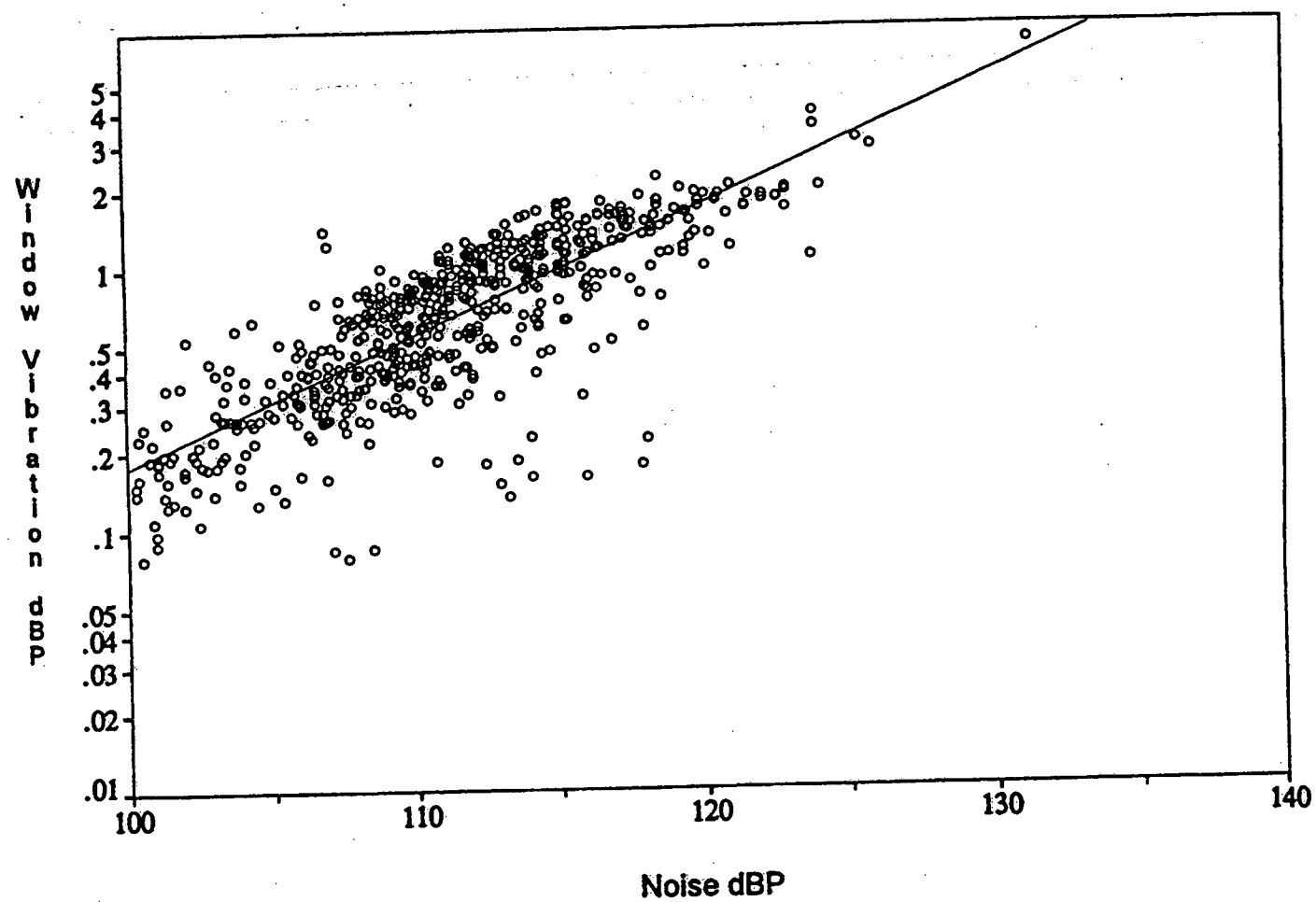


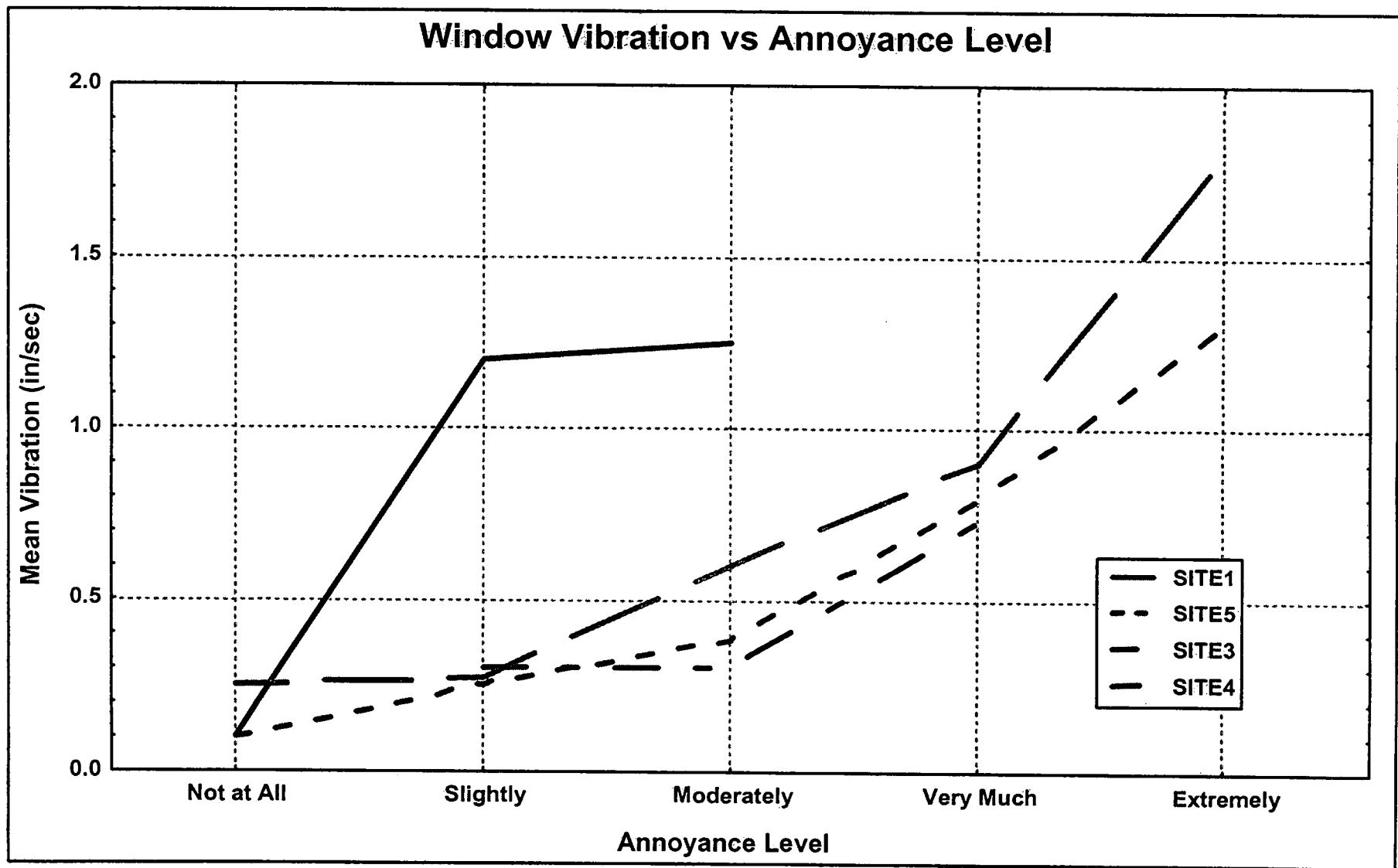
Sound Pressure Levels Sufficient to Cause Perceptible Vibrations of House Structure Elements Over a Range of Frequencies





Noise at Site 8 vs Window Vibration





Impulsive Noise Guidelines, 1976

**Predicted Sound
Level, dBP**

Risk of Complaints

Action

<115	Low risk of complaints	Fire all programs
115-130	Moderate risk of complaints	Fire important tests. Postpone non-critical testing, if feasible
130-140	High risk of complaints	Only extremely important test should be fired, possibility of damage.
>140	Threshold for permanent physiological damage to unprotected ears. High risk of physiological and structural damage claims.	Postpone all explosive operations.

Variation of sound level at 10 miles due to propagation conditions.

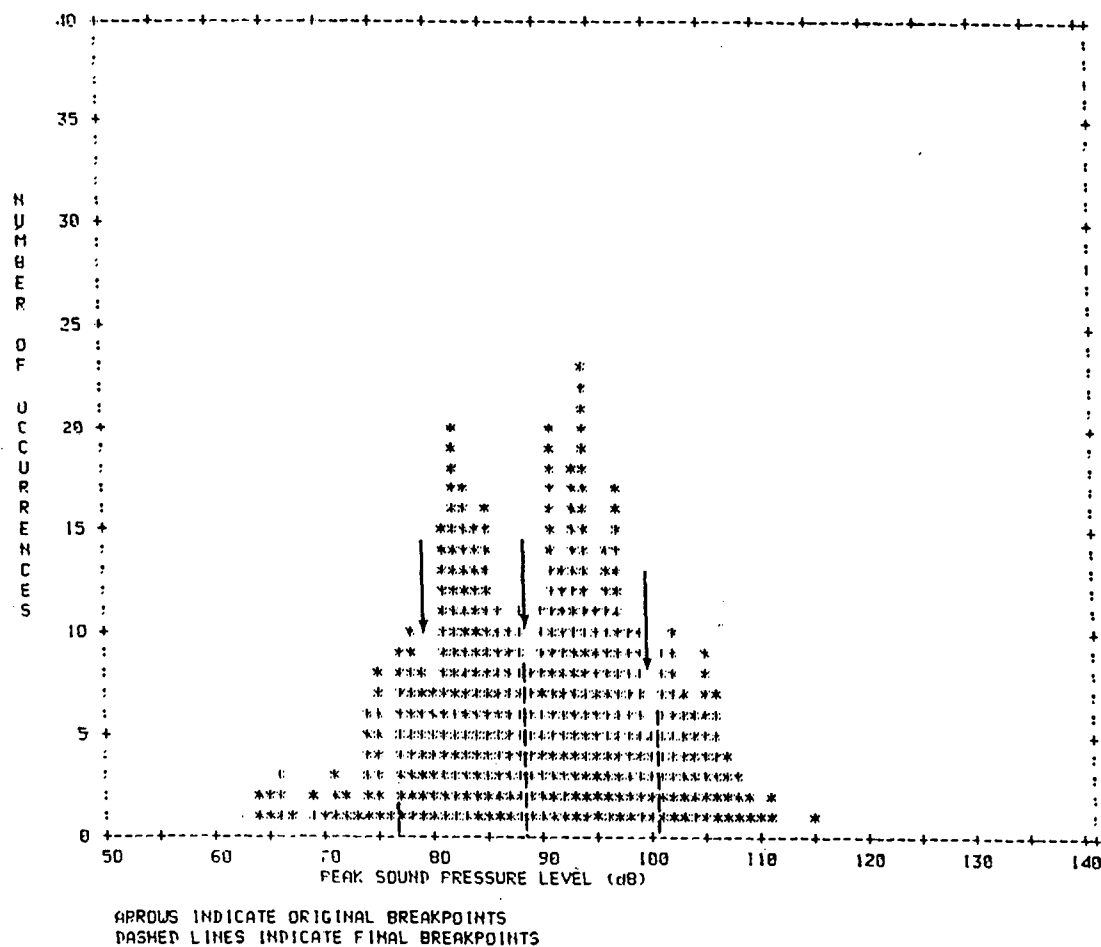


Figure 11. Ten-mi nighttime peak sound pressure level distribution (original and final breakpoints).

UNIFORM PROFILE

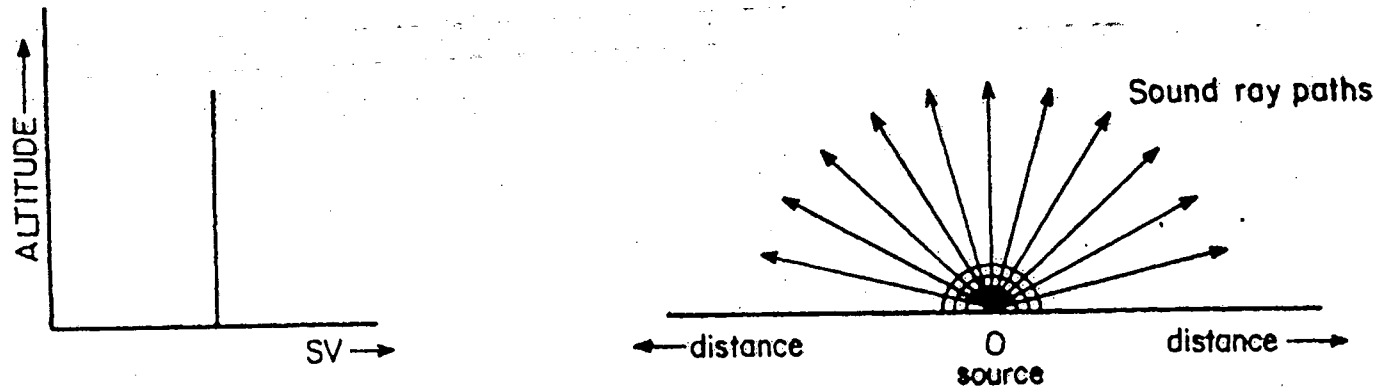


Figure D2. Zero gradient condition model and corresponding ray paths.

Sound level decreases by 6 dB per doubling of distance due to geometric spreading (This is a “base” case that actually never occurs. Additional attenuation occurs due to several causes

DECREASING PROFILE (upwind or sunny day)

74

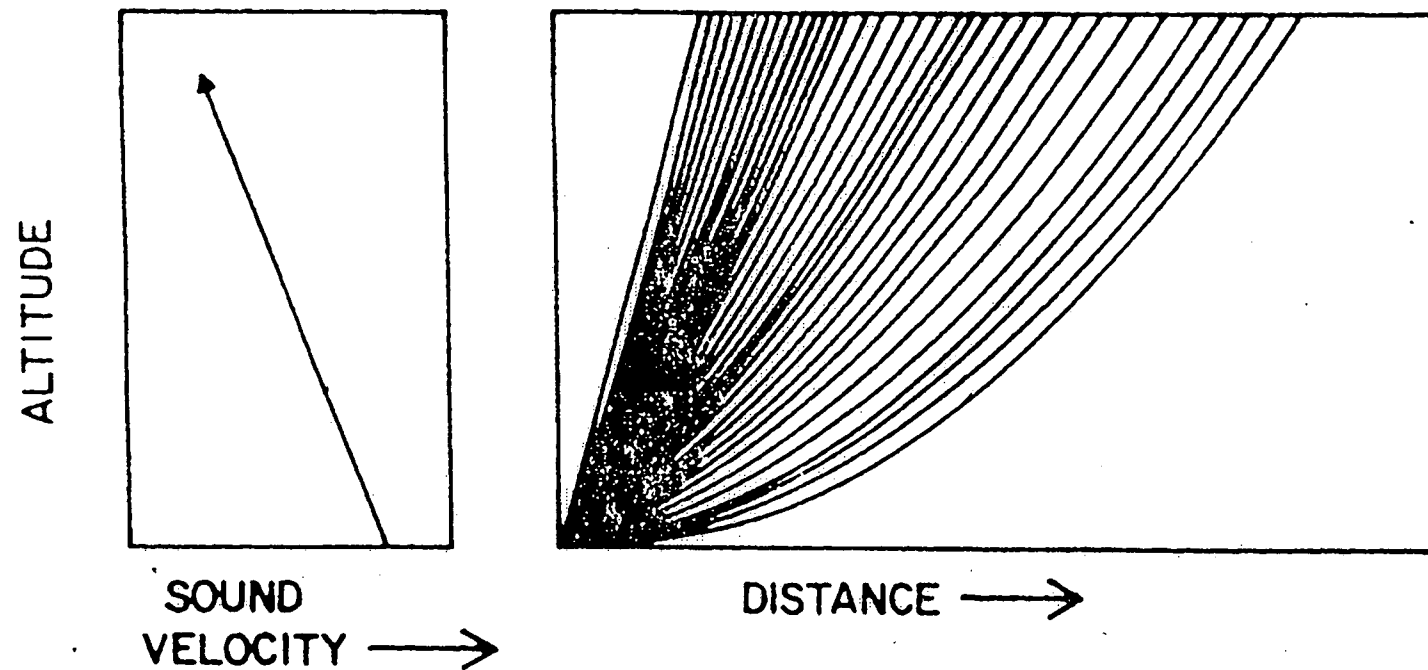


Figure 13. Negative sound velocity gradient and corresponding ray paths.
Results in lower sound levels.

INCREASING PROFILE (downwind, night)

75.

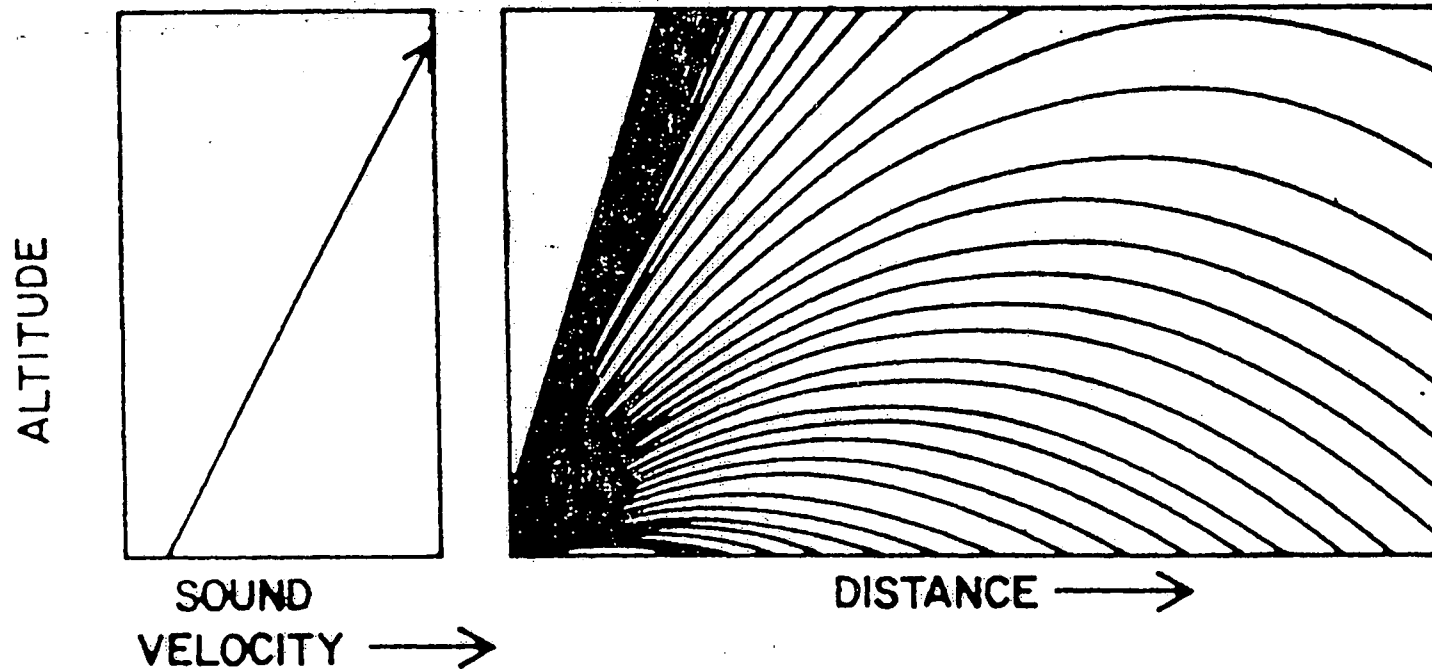


Figure 14. Positive sound velocity gradient and corresponding ray paths.

Results in higher sound levels.

INVERSION

(decrease, then increase)

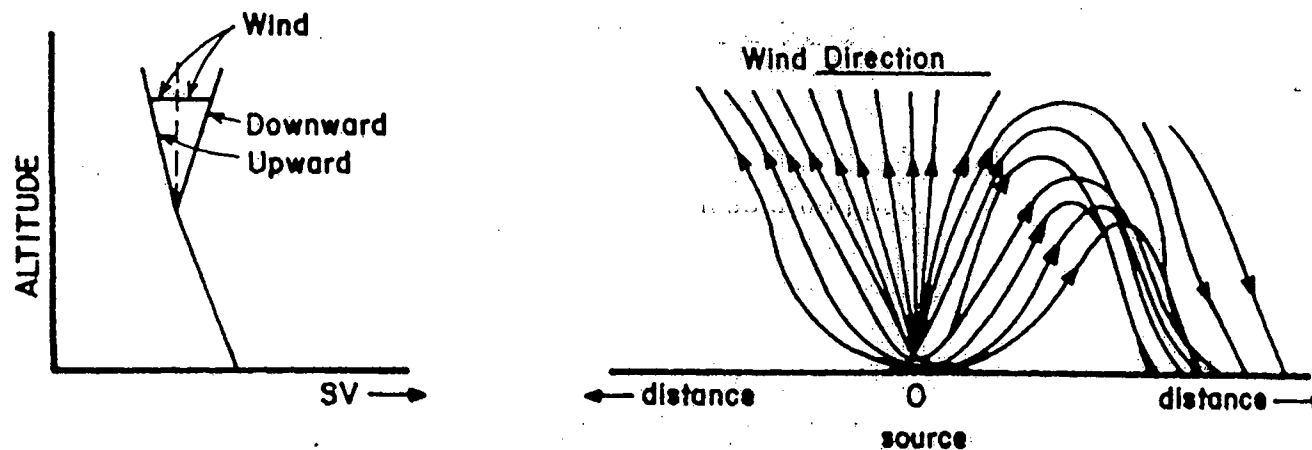
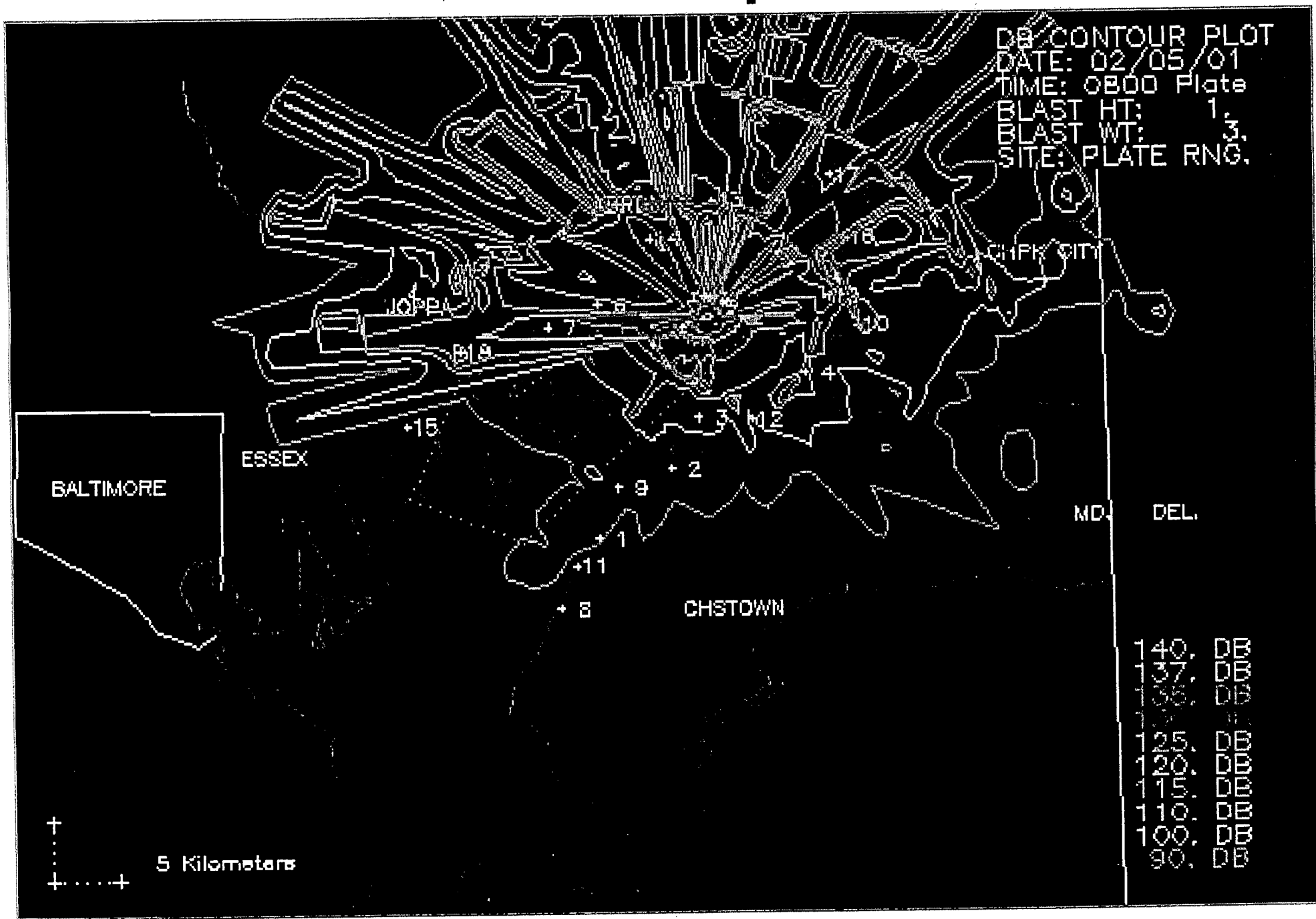


Figure D5. Directional wind effects -- sound velocity profile and ray paths.

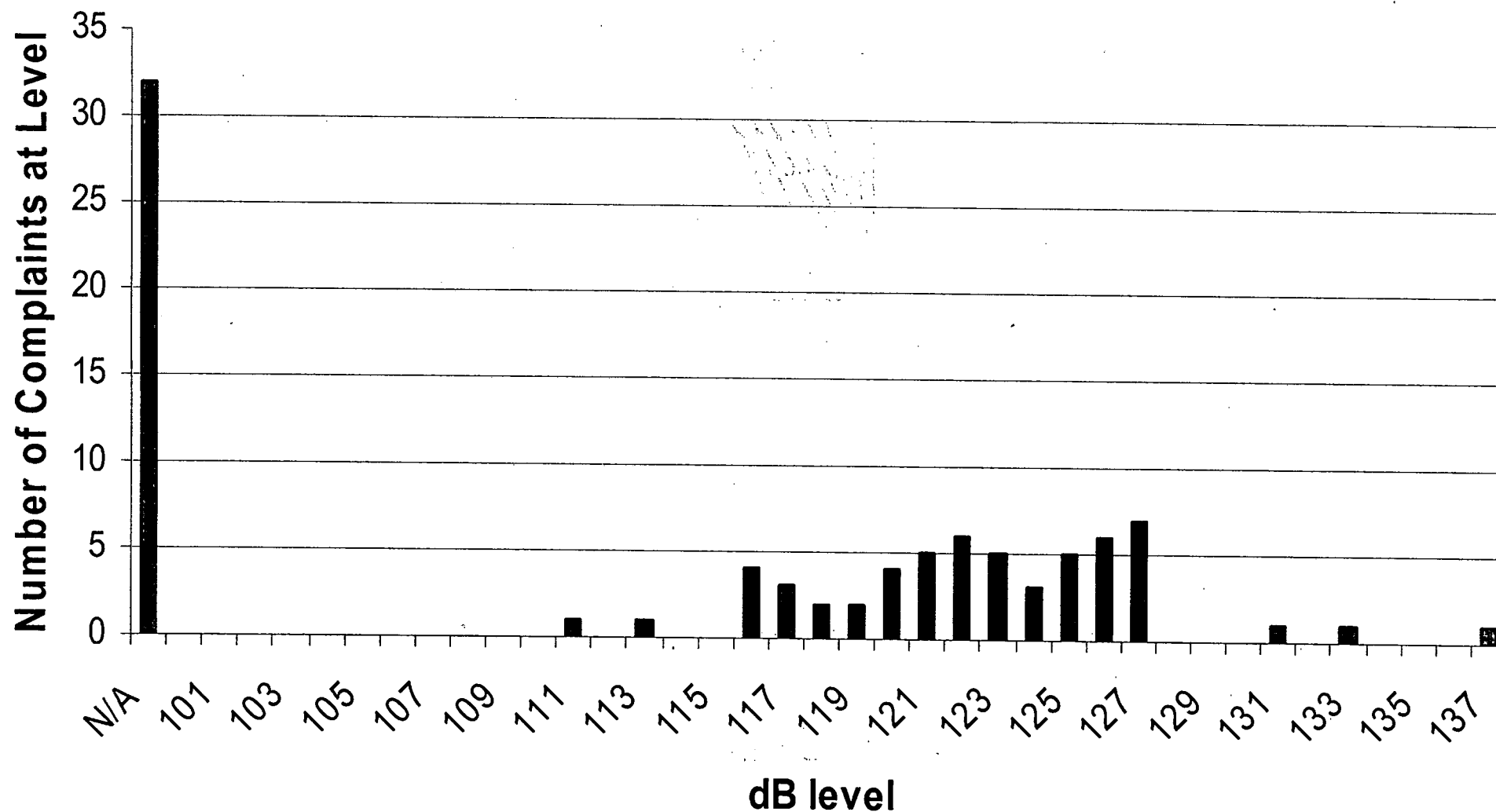
Can result in much higher sound levels.

NAPS Sample



Complaints vs. Peak

Highest Event Registered Associated with a Complaint



(@ 6-7 km)



Questions?

Comparison to Federal Standards

There is no corresponding federal standard to this proposed action.

Estimate of Economic Impact

The proposed action has no economic impact.

Economic Impact on Small Businesses

The proposed action has minimal or no economic impact on small businesses.

Opportunity for Public Comment

Comments may be sent to J. Robert Burk, Executive Director, Maryland Horse Industry Board, Maryland Department of Agriculture, 50 Harry S. Truman Parkway, Annapolis, Maryland 21401, or fax to (410) 841-5999, or call (410) 841-5861, or email to BurkJR@mda.state.md.us. Comments will be accepted through February 23, 2004.

06 Board Evaluation.

A. (text unchanged)
B. The Board shall disapprove an application for [either] any of the following reasons:

- (1) The application is incomplete or does not comply with these regulations; [or]
- (2) Funds are not available[.]; or
- (3) An applicant who is subject to stable licensing under COMAR 15.16.01 fails to possess a current license upon application submission.

C. — D. (text unchanged)

07 Funding Conditions.

A. (text unchanged)
B. An applicant who is subject to stable licensing under COMAR 15.16.01 shall maintain a current stable license.
[B.] C. — [C.] D. (text unchanged)

LEWIS R. RILEY
Secretary of Agriculture

Title 26 DEPARTMENT OF THE ENVIRONMENT

Subtitle 02 OCCUPATIONAL, INDUSTRIAL, AND RESIDENTIAL HAZARDS

26.02.03 Control of Noise Pollution

Authority: Environment Article, §§3-401,
Annotated Code of Maryland

Notice of Proposed Action

[04-011-P]

The Secretary of the Environment proposes to amend Regulations .01 and .03 under COMAR 26.02.03 Control of Noise Pollution.

Statement of Purpose

The purpose of this action is to update definitions, calculations, and exemptions.

Comparison to Federal Standards

There is no corresponding federal standard to this proposed action.

Estimate of Economic Impact

I. Summary of Economic Impact. The costs for hearings associated with variances are intended to be paid directly by the applicant. If the costs are incurred by the Department, the cost would be reimbursed by the applicant. Typical costs are less than \$1,000 and the average number of variances is less than one per year.

II. Types of Economic Impact.

	Revenue (R+/R-)	Expenditure (E+/E-)	Magnitude
A. On issuing agency:	(R+)(E+)		<\$1,000
B. On other State agencies:	NONE		
C. On local governments:	NONE		
	Benefit (+)	Cost (-)	Magnitude
D. On regulated industries or trade groups:	(-)		<\$1,000
E. On other industries or trade groups:	NONE		
F. Direct and indirect effects on public:	NONE		

III. Assumptions. (Identified by Impact Letter and Number from Section II.)

A. and D. See I. Summary of Economic Impact, above.

Economic Impact on Small Businesses

The proposed action has minimal or no economic impact on small businesses.

Opportunity for Public Comment

The Department of the Environment will hold a public hearing concerning the adoption of these amendments on March 1, 2004 at 10 a.m. at the Department of the Environment located at 1800 Washington Boulevard, Baltimore, Maryland 21230.

All interested persons are invited to attend and give their views. Any hearing impaired person may request an interpreter to be present at the hearing by giving 5 working days notice to Deanna Miles-Brown, Regulations Coordinator, at (410) 537-3173.

Comments may be sent to Deanna Miles-Brown, Department of the Environment, TARSA Administration, 1800 Washington Boulevard, Baltimore, Maryland 21230, or call (410) 537-3173, or fax to (410) 537-3873, or email to dmilesbrown@mde.state.md.us. Comments will be accepted until the close of business on March 24, 2004.

.01 Definitions.

A. — E. (text unchanged)
F. "Decibel (dB)" means a unit of measure equal to ten times the logarithm to the base ten of the ratio of [a particular sound pressure squared to a standard reference pressure squared] *the square of the sound pressure to the square of a standard reference pressure*. For the purpose of this subtitle, 20 micropascals shall be the standard reference pressure.

G. — L. (text unchanged)
M. "IEC" means *International Electrotechnical Commission*.

[M.] N. — [O.] P. (text unchanged)
[P.] Q. "Periodic noise" means noise possessing a repetitive on-and-off characteristic *with a rapid rise to maximum and a short decay not exceeding 2 seconds*.

[Q.] R. — [R.] S. (text unchanged)
[S.] T. "Sound level" means, in decibels, the weighted sound pressure level measured by the use of a sound level meter [satisfying the requirements of ANSI S1.4 1971 "Specifications for Sound Level Meters"]. Sound level and

noise level are synonymous. The weighting employed shall always be specified.

[T.] U. "Sound level meter" means an instrument, meeting [ANSI S1.4 1971 "Specifications for Sound Level Meters"] *International Electrotechnical Commission and National Standards Institute standards* comprising a microphone, an amplifier, an output meter, and frequency-weighting network(s) that is used for the measurement of sound pressure levels in a specified manner.

[U.] V. Sound Pressure.

(1) (text unchanged)

(2) For a steady sound, the value of the sound pressure average over a period of time.]

(3) (2) (text unchanged)

[V.] W. "Sound pressure level" means, in decibels, 20 times the logarithm to the base ten of the ratio of a sound pressure to the reference sound pressure of 20 micropascals (20 micronewtons per square meter). In the absence of any modifier, the [level] pressure is understood to be that of a root mean-square pressure.

[W.] X. — [X.] Y. (text unchanged)

[Y.] Z. "Zoning district" means a general land use category, defined according to local subdivision, the activities and uses for which are generally uniform throughout the subdivision. For the purposes of this regulation, property which is not zoned ["residential", "commercial", or "industrial"] "industrial", "commercial", or "residential" shall be classified according to use as follows:

(1) "Commercial" means property used for buying and selling goods and services;

(2) "Industrial" means property used for manufacturing and storing goods.]

(1) "Industrial" means property used for manufacturing and storing goods;

(2) "Commercial" means property used for buying and selling goods and services;

(3) (text unchanged)

.03 General Regulations.

A. Noise and Vibration Prohibitions.

(1) — (4) (text unchanged)

(5) A person may not operate or permit to be operated an off-road internal combustion engine powered recreational vehicle, including, but not limited to, a dirt bike, an all terrain vehicle, a go cart, a snowmobile, or a similar vehicle, on private property closer than 300 feet to a neighboring residence or the associated curtilage, without the written permission of the affected resident, unless it can be demonstrated to the Department that the vehicle can be operated within the noise limits specified in Table 2 under §A(1) of this regulation.

B. Exemptions.

(1) The provisions of this regulation may not apply to devices used solely for the purpose of warning, protecting, or alerting the public, or some segment thereof, of the existence of an emergency or hazardous situation.

(2) The provisions of this regulation do not apply to the following:

(a) Household tools and portable appliances in normal usage[,] during daytime hours.

(b) — (i) (text unchanged)

(j) Sound not electronically amplified created by sporting, amusement, and entertainment events and other public gatherings operating according to terms and conditions of the appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facili-

ties, parades, and public celebrations. This exemption only applies between the hours of 7 a.m. and 12 midnight.]

(j) Sound except those sounds that are electronically amplified, between 7 a.m. and midnight, created by:

(i) Sporting events (except trap shooting, skeet shooting, or other target shooting);

(ii) Entertainment events; and

(iii) Other public gatherings operating under permit or permission of the appropriate local jurisdiction.

(k) — (m) (text unchanged)

(n) Household pets on residential property that are maintained in accordance with local zoning requirements.

(o) Except in Allegany, Anne Arundel, Baltimore City, Calvert, Charles, Garrett, Howard, Montgomery, St. Mary's, and Washington Counties, trap shooting, skeet shooting, or other target shooting between the hours of 9 a.m. and 10 p.m. on any range or other property of a shooting sports club that is chartered and in operation as of January 1, 2001.

(p) Trash collection operations between the hours of 7 a.m. and 10 p.m.

(3) The events and gatherings under §B(2)(j) of this regulation include, but are not limited to, athletic contests, amusement parks, carnivals, fairs at fairgrounds, sanctioned auto racing facilities, parades, and public celebrations.

(4) In Frederick County or Frederick City, a fair listed in the Maryland agricultural fairs and shows schedule that is maintained by the Maryland Agricultural Fair Board, or any other event held on the same grounds and listed by the Agricultural Fair Board, is exempt from this chapter.

C. Variance Procedure.

(1) — (6) (text unchanged)

(7) Applicants shall be responsible for public hearing costs, as directed by the Department, including the hearing advertisement, facility rental, court reporter, and preparation of the transcript of the hearing.

D. Measurement.

(1) The equipment and techniques employed in the measurement of noise levels may be those recommended by the Department, which may, but need not, refer to currently accepted standards or recognized organizations, including, but not limited to, the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), Society of Automotive Engineers (SAE), *International Electrotechnical Commission (IEC)* and the United States Environmental Protection Agency (EPA).

(2) (text unchanged)

(3) Sound level meters used to determine compliance with Regulation .03 shall meet or exceed the specifications [of the American National Standards Institute or its successor bodies ANSI S1.4-1971] for Type II sound level meters.

KENDL P. PHILBRICK

Acting Secretary of the Environment

Subtitle 08 WATER POLLUTION

Notice of Proposed Action

[04-027-P-I]

The Secretary of the Environment proposes to:

(1) Amend Regulations .03, .03-2, .03-3, .05, and .08 under COMAR 26.08.02 Water Quality;

(2) Amend Regulation .03 under COMAR 26.08.03 Discharge Limitations;

82

**Response To Comments
Received In Response To
"Notice of Proposed Action"**

**The Secretary of the Environment proposes to amend Regulations
.01 and .03 under COMAR 26.02.03, Control of Noise Pollution**

Published In The Maryland Register on Jan. 23, 2004 (Vol. 31(2))

Response Statement:

The Department of the Environment solicited comments on the proposed changes in the Maryland Register and held a formal public hearing on March 1, 2004 at 6:00 p.m. at MDE headquarters at 1800 Washington Blvd, Balto., MD 21230. An earlier time at 10:00 a.m. on the same date had been inadvertently published in the Maryland Register, but was subsequently re-advertised to 6:00 p.m. MDE staffed the location for the earlier time. No one appeared at either the 10:00 a.m. or 6:00 p.m. time for the public hearing. Comments were received from three persons via, email, letter, and fax as indicated below.

Name	Email address	Location	Phone number	Fax number
Dawn Johnsson	johnsson@qis.net	Finksburg, MD		
David & Catherine King	<u>David.king@ssa.gov</u>			410-549-6859
Edwin Singer, Director, Bur. Of Environmental Health		Carroll Co Health Dept 290 S. Center St. P.O. Box 845 Westminster, MD 21158	410-876-1884 800-966-3877	410-876-4430

The comments from the above individuals are presented below in summary form with MDE responses following:

1. Comment: The proposed restriction of household tool use should address and allow emergency concerns. Nighttime (darkness) is not a good means of defining allowable use.

MDE Response: The regulations specifically exempt all elements of the noise control regulations in emergency situations (COMAR 26.02.03.03 B 2 (h)). This broad exemption has been used by the department in allowing any noise that is being generated as a consequence of natural or man-induced emergency situation. Nighttime is defined in regulations as being between 10 PM and 7 AM. Thus, concerns expressed regarding the use of tools after dark did not consider that the nighttime standard would not be applicable until after 10 PM. As a further consideration, occasional nighttime use would not normally result in any compliance actions. It should also be noted that the program is complaint

43

driven and if an unusual circumstance, such as the repair of a roof arises, the one-time event would not be measured and would result in the issuance of a letter of complaint, which would not result in any compliance actions.

2. Comment: The restrictions on off-road vehicles would be a prohibition and not a limitation. The proposal would regulate the vehicles "very closely or in an unusual way." Do you expect people to go around getting written permission for doing something on their own property? What justification is there to the 300 foot distance. Year round enforcement doesn't take into consideration winter conditions when windows are closed. Do you realize that it would take more than 8 acres to be 300 feet from adjacent properties? Why can't a farmer ride his ATV up his lane? What about farm tractors? This is government intrusion into legal activity on private property.

MDE Response: The stated intent of the recreational vehicle standard is as an alternative means of assessing compliance based on existing numerical noise standards. While the means of achieving compliance is different, it has no greater restrictions than the existing numerical standard. This is not a new or unusual concept. Baltimore County has had a similar ordinance in effect for a number of years. Operators of the vehicles are still allowed to generate noise to the 65 dB level during daytime hours on receiving property as previously allowed, the only change is that they would be required to demonstrate compliance to enforcing authorities. The regulations do not provide for indoor noise limits. The standards were established on the basis of the "right to enjoyment" of their own property, to include freedom from excessive noise outside of their home. The existing standard of 65 decibels remains as a significant annoyance, especially in otherwise quiet rural settings, so the imposition of the standard should not be considered as an unwarranted imposition. The Department and the Noise Advisory Council are fully aware that the 300-foot setback distance could preclude operations on relatively modest sized suburban parcels unless enhanced muffler systems on the vehicles are employed. Farm tractors are exempt under existing regulations. ATV operations would also not be adversely affected if they have appropriate muffler systems.

Noise, like any other environmental pollutant, can be legal within the bounds of an individual's property. But in most cases with environmental pollutants, if the condition persists beyond the property line and interferes with the lawful activities of others on their property, government has reserved the right to impose reasonable limits on the subject activity.

3. Comment: "I completely support citizens' rights of freedom to use their property as they wish. When this right is abused to the point it adversely affects other citizens, it is the government's responsibility to step in and regulate those actions and/or activities." This letter is to express full support for the MDE proposal to clarify the current noise control program relating to off-road vehicle noise.

MDE Response: The Department concurs with the need to impose limitations on noise when it intrudes at a level of significant annoyance onto the property of others.

84

4. Comment: We believe the new section addressing off-road vehicles will simplify our ability to identify violations and gain compliance. (from local government)

MDE Response: The Department concurs with the concept that the proposed off-road recreational vehicle noise standard will enhance the ability of state and local governments to achieve compliance.

5. Comment: "Curtilage" needs to be defined with a set distance from a residential dwelling.

MDE Response: The Department did not want to totally restrict the operation of recreational vehicles within 300-feet of adjacent properties where the parcel sizes were sufficiently large to allow natural sound attenuation to occur before it reached normally occupied areas. This would be of primary application on farmlands of ten or more acres. The use of the term "curtilage" was specifically chosen to provide some level of enforcement discretion to the inspector. The intent is to restrict the operation of vehicles within 300-feet of land that is likely to be routinely occupied by a property owner. Thus, a property owner that might have a garden or accessory building beyond a distance of 300 feet from their residence and routinely utilizes that area would be considered to be within their curtilage area and entitled to relief.

Recognizing that "curtilage" could be defined in more detail, the Department is proposing to add a definition in the regulation. It is proposed to read as follows:

Curtilage means: The enclosed land surrounding a house or dwelling and includes all areas maintained in lawn or horticultural plantings and may be bounded by a fence or wall, but would not typically include areas more distant than 300 feet from the dwelling unless that area was horticulturally maintained and routinely used as an area of personal refuge, or that area supported an accessory structure that was routinely utilized.

6. Comment: The phrase "... except those sounds that are electronically amplified ..." should be stricken. It would not be possible to distinguish between those noises and the crowd.

MDE Response: The Department recognizes the difficulties in distinguishing crowd noise from those that are electronically amplified. However, there are public gatherings and sporting events where amplified sound is generated that can be distinguished from crowd noise. This would be especially of note for outdoor musical "concerts". Also, event loudspeaker announcements can also rise well above the crowd noise. These situations can usually be addressed through the location and positioning of multiple speakers throughout the area and the lowering of the volume settings. The character of electronically amplified noise can also be more annoying than crowd noise because humans typically perceive artificial noise as being not natural and more intrusive. Given the above, the Department will continue with the current language, but will present this concept to the Noise Advisory Council for consideration.

Baltimore, Maryland
NOISE-CON 2004
2004 July 12-14

Alerting Individuals about their Noise-Sensitivity before They Move into a Noise-Impacted Neighborhood

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1. INTRODUCTION

In an effort to protect the citizenry from unhealthy community noise exposures, governments publish noise contour maps. In areas where land is undeveloped, these maps can serve as a *caveat emptor*. Given that only 20% of subjectively-reported noise annoyance is explained by the measurable sound¹, how is that *emptor* to decide? Which personal and situational variables are relevant to the decision? Fields², working with social surveys, determined six such variables to be statistically robust. Four are pure attitudes (fear of danger from the noise source, noise prevention beliefs, beliefs about the importance of the noise source, and annoyance with non-noise impacts of the noise source). Another, isolation from sound in the home, belongs to the acoustical engineer. The sixth, general noise sensitivity belongs to the psychologist.

2. APPROACH

During a noise management workshop at the 2003 USEPA Region III Environmental Colloquium, a participant suggested that noise-sensitive (NS) people be advised not to move into noisy neighborhoods. This suggestion led to a review of the literature to determine the best way to alert people to their noise-sensitivity. Two problems surfaced as a result of this review: (1) The failure of any physiological measure to identify the NS person and (2) a statistical association between being NS and neurotic. After discussing these problems, suggestions are provided on how to alert NS individuals without offending them.

3. THE SEARCH FOR PHYSIOLOGICAL INDICATORS OF NOISE SENSITIVITY

If noise-sensitivity were as easy to measure as blood pressure, the task of informing the NS person might be simple. Several physiologists and psychologists have studied the NS and found few differences between groups. At traffic noise levels higher than would be found in a normal neighborhood [85 dB, A-weighted], NS men showed significantly larger increases in heart rate, systolic and diastolic blood pressure than NNS men.³ At noise levels more typical of real neighborhoods, however, the cardiovascular differences between NS and NNS subjects were negligible.⁴ NS individuals do not hear any better than the NNS.⁵ Their reaction time to loud sounds is no different than the reaction time of the NNS. The NS doesn't experience a loud sound as any louder than a NNS. When listening to helicopter noise at loud levels (80 dB maximum), the blood pressure of NS subjects is no higher than the BP of NNS.⁶ In short, common physiological measures cannot be used to identify the NS person.

4. NOISE-SENSITIVE PEOPLE AND NEUROTICISM

The most controversial research concerning the NS population is about psychiatric symptoms. A Norwegian study found NS to be predictive of depression among men.⁷ An English study found NS women exposed to aircraft noise to have a greater incidence of phobic disorders and depression.⁸ A Japanese study reported similar findings.⁹ An association between NS and "neuroticism" has been reported from England,¹⁰ Sweden,¹¹ and Serbia.¹² If translated into a typical 21st Century "sound byte", the statistical connection between NS and neuroticism could be used to isolate and ignore the NS population. To call someone "neurotic" is pejorative in American society. Managers of noisy facilities, such as airports, industrial operations and military installations, receive most of their noise complaints

from a few people. Labeling those few people "neurotic" could trivialize legitimate public concerns. If one looks at the actual details of these studies, this statistical association is seen as quite complex.

First, neurotic and neuroticism are not the same words. Neurotic is a vague term used widely in every day conversation to suggest that someone is too nervous or unstable. Neuroticism is a construct derived from a statistical procedure known as *factor analysis*. This statistical procedure allows psychologists to look at the interconnections between answers to a set of questions and find "clumps" of answers that are statistically interrelated. The *neuroticism scale* is one of five important dimensions describing the ways in which different personalities differ. The other scales are *openness*, *conscientiousness*, *extraversion*, and *agreeableness*. When people answer questions about their personality, the answers tend to segregate along these five dimensions.

Second, questions designed to measure neuroticism and noise sensitivity are both measuring negative affectivity. People who are more bothered by noise in their neighborhood than their neighbors can be expected to experience negative affectivity. If these NS individuals were transported to a completely quiet environment, the negative affectivity might disappear, but they would still remain NS.

In 1992, Dr. Stephen Stansfeld, an English psychiatrist who has written more about this subject than anyone else, provided the following summary:

*In summary, noise sensitivity may be comprised of two elements. Noise is important to noise-sensitive people who attend to noises more, discriminate between noises more, and tend to find noises more threatening and out of their control than people who are not sensitive to noise. Secondly, because of negative affectivity, they react to noises more than less sensitive people, and may adapt to noises more slowly. This may result in a greater expression of annoyance to noises than in less sensitive people, both because this is a response to greater threat and also because they may have a general tendency to be annoyed, irrespective of noise. Both these latter factors may be active in explaining the association between noise-sensitivity and current psychiatric disorder and explaining why noise sensitivity is a vulnerability factor for psychiatric disorder.*¹³

5. EMPHASIZING THE POSITIVE

Being high on the neuroticism scale can be a burden to individuals and the people close to them. At the same time, neuroticism comes with some benefits, and a more effective way to reach the NS individual would be to emphasize the positive.

The English authors of one of the earliest of these studies¹⁴ wrote in 1972:

The most outstanding impression of those people who were noise sensitive was that they were typically friendly, generous and sociable and very much aware of their environment. As is well known about those who complain of noise they were equally liable to complain about other defects in their neighborhood, e.g. the drains, etc. On the positive side they were frequently active in the community, e.g. in voluntary social work and very much aware of the needs of others. Very often they were 'creative', having some hobby such as painting or writing. Usually they seemed to be of above-average intelligence compared with their neighbors."

The authors of a study of 3,445 persons exposed to noise in Amsterdam reported that noise sensitivity appears to be more strongly represented among persons with a higher socio-economic status.¹⁵

Another way of looking at the NS is that they have a very active "orienting response" (OR). The OR is sometimes called the orienting reflex. It was first recognized and reported by the famous Russian physiologist Sechenov in the 1850s in his book Reflexes of the Brain. Pavlov (of salivating dogs fame) referred to the OR as the "What is it?" reflex. In the 1950's, a third Russian physiologist, Sokolov, documented how this distinctive pattern of changes in respiration, heart, skin conductance, eyes and ears gradually decreases when a novel sight or sound is repeated. For our ancestral hunter-gatherers living in

natural quiet, an active OR was essential for survival. It helped the hunter keep food on the table and the gatherer to avoid predators. However, in a world filled with roars, buzzes and bangs, an active OR can be a disadvantage, especially for people whose nervous systems have difficulty "turning off" the OR.

The process of "turning off" the OR is called "habituation," and NS subjects have a harder time habituating to a repeated sound than NNS subjects. For example, an English study compared changes in skin conductance when NS and NNS women listened to sounds at 50, 75 and 100 dB, A-weighted. The NS women were more reactive to the first presentation of the sound and they were slower to habituate when the sounds were repeated.¹⁶

The OR prepares our sensory system to take in new information, but if the OR is over active, the NS individual can be distracted from focusing on other important information. So, the NS person may complain, "I can't concentrate with all this noise," whereas that person's NNS spouse may be completely unperturbed. Such distractibility is documented in another study of English women. Women experiencing a relatively high and a relatively low exposure to aircraft noise completed a twenty-question "Everyday Errors Questionnaire"¹⁷ An example of one of these "everyday error questions" was "*Do you start doing one thing at home and get distracted into doing something else (unintentionally)?*" The NS women reported more everyday errors in both the low and high aircraft noise exposure neighborhoods.

The NS individual doesn't stop being vigilant when she sleeps. The difference in sleep quality between the NS and NNS is not as large at relatively high noise exposures as at relatively low exposures. This tendency was documented in a Swedish study of sleep disturbance from traffic noise. When NS and NNS subjects slept in a 60 dBA environment, the differences in sleep quality between the two groups in were not as pronounced as when both groups slept in a 50 dBA environment.¹⁸

The tendency for the NS to be more disturbed by moderately loud sounds than the NNS is also reflected in judgments of subjective annoyance or unpleasantness. When listening to a clearly aversive sound (jackhammer), the NS rates the unpleasantness of the sound in the same way as the NNS. However, for somewhat less aversive sounds (vent, mower, brake, truck, crash, train), the NS gives a higher unpleasantness rating than does the NNS.¹⁹ In a study of 2,933 residents of Greater London exposed to traffic noise, the NS reported being more annoyed than the NNS at relatively low exposures, but converged with the NNS as the intensity of exposure increased.²⁰ A similar phenomenon has been observed in the laboratory.²¹

6. BECOMING AWARE OF ONE'S NOISE SENSITIVITY

In a 1999 review of different field surveys of response to transportation noise, the incidence of noise sensitivity among a sample of 15,171 people was 22%²² so it seems safe to guess that at least one out of five people are NS. In that review, 46% had "low sensitivity" and 32% had "medium sensitivity." An English study in which the incidence of NS was somewhat higher showed that the incidence of NS is stable across age groups²³. About 30% of young people (16-24 years) said they were NS, 35% said they were NNS, and about 34% were neutral. For people ages 65 and older, only 17% were neutral and about 30% were NS. It should be noted that the people who said they were NS were living with a noise exposure. The objective should be to educate the NS population before they move into a noisy area.

The simplest way to alert the NS public is to provide them with copies of the Weinstein's Noise Sensitivity Scale. This self-report test has been in use since 1978,²⁴ and other researchers have found the scale to be satisfactory with regards to reliability, internal consistency, factor structure and construct validity.²⁵ Weinstein's original questions are reproduced in Table 1. In Weinstein's original work, the average score for the NS was 67.9 and the average score for the NNS was 39.8. The highest possible NS score is 126. Weinstein's scale is designed to capture sensitivity to different noise sources. This design is consistent with research showing that people who are more annoyed than the general population by one source of noise will also be more annoyed by another source of noise.²⁶

7. CONCLUSION

A holistic approach to environmental noise management should include an effort to inform the NS population before they move into a noisy neighborhood. By using the Weinstein Noise Sensitivity Scale,

44

emphasizing the positive side of being a NS person and avoiding mention of the statistical association with neuroticism, it should be possible to educate without offending.

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Table 1
Items on the Original Weinstein Noise Sensitivity Scale

1. I wouldn't mind living on a noisy street if the apartment I had was nice.
2. I am more aware of noise than I used to be.^a
3. No one should mind much if someone turns up his stereo full blast once in a while.
4. At movies, whispering and crinkling candy wrappers disturb me.^a
5. I am easily awakened by noise.^a
6. If it's noisy where I'm studying, I try to close the door or window or move someplace else.^a
7. I get annoyed when my neighbors are noisy.^a
8. I get used to most noises without much difficulty.
9. How much would it matter to you if an apartment you were interested in renting was located across from a fire station.^a
10. Sometimes noises get on my nerves and get me irritated.^a
11. Even music I normally like will bother me if I'm trying to concentrate.^a
12. It wouldn't bother me to hear the sounds of everyday living from my neighbors (footsteps, running water, etc).
13. When I want to be alone, it disturbs me to hear outside noises.^a
14. I'm good at concentrating no matter what is going on around me.
15. In a library, I don't mind if people carry on a conversation if they do it quietly.
16. There are often times when I want complete silence.^a
17. Motorcycles ought to be required to have bigger mufflers.^a
18. I find it hard to relax in a place that's noisy.^a
19. I get mad at people who make noise that keeps me from falling asleep or getting work done.^a
20. I wouldn't mind living in an apartment with thin walls.
21. I am sensitive to noise.^a

NOTE: Most items are presented on a 6-point scale ranging from agree strongly (1) to disagree strongly (6).

^aItems scored in opposite direction before responses are summed.

91

Draft
MEETING AGENDA
ENVIRONMENTAL NOISE ADVISORY COUNCIL
AND THE INTERAGENCY NOISE CONTROL COMMITTEE

Monday

May 17, 2004

9:00 AM to 11:30 PM

Aeris Room - Lobby

Maryland Department of the Environment
1800 Washington Blvd.

- 09:00 Welcome and Introductions – Dr. George Luz, Co-Chair, Noise Advisory Council
Dr. Fred Schmitz, Co-Chair
- 09:05 Member introductions -
- 09:10 Status of things
Regulations –
Legislation – none
Membership – retirements
MDE staff – Retirement, New assignment
- 09:20 Status of Community Self-Help Manual – Dr. Luz
- 09:30 Guest presentation:
Dr. Andrew Sawyers (MDE) – Environmental Justice Concepts
- 10:00 APG blast and cliff erosion – Dr. George Luz
- 10:20 Break
- 10:30 MDE Noise Information Database and Statistics Review – John Hill
- 10:45 Issues for discussion
Council and Committee
- 1 – Appropriateness of sporting event exemptions (handout – EPA assumptions for sporting events)
 - 2 – Standards for inside residential noise (apartments and townhomes) (base frequencies)
 - 3 – Electronically amplified noise from sporting and amusement events, is it possible and appropriate to regulate it if the crowd noise exceeds it?
 - 4 – Measurement procedures
 - 5 – Instrumentation procedures for code
- Interagency Committee
- 4 – Question for DNR, are there any common or pressing noise issues with boats or pile drivers?
 - 5 – Question for SHA, are there any common or pressing noise issues?
 - 6 – Question for MVA, MSP, are more vehicles on the highway with modified muffler systems (trucks, cars, etc.) – especially Honda Civics
 - 7-
- 11:30 Public Presentations
- 12:00 Adjourn
- Next Meetings – all on Monday
September 20
December 6

92

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December 6

93

94

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Date: 05/11/2004 3:28:40 PM
Subject: Noise Council reminder for May 17th

To all:
Just a reminder.
The Noise Council will meet as outlined in the attached.

If you have trouble opening the Word file, please email and I'll send the text in the body of the email.
George

The information contained in this communication may be confidential, is intended only for the use of the recipient named above, and may be legally privileged.
If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this communication, or any of its contents, is strictly prohibited.
If you have received this communication in error, please re-send this communication to the sender and delete the original message and any copy of it from your computer system. Thank you.

<<<<GWIASIG 0.07>>>>

CC: "John Hill" <JHill@mde.state.md.us>, "Marie Halka" <mhalka@mde.state.md.us>, "Rich Eskin" <reskin@mde.state.md.us>

95

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- Next Meetings – all on Monday
September 20
December 6

96

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Date: 04/08/2004 9:28:42 AM
Subject: Noise Advisory Council & Interagency Committee

To all:

First notice - The Environmental Noise Advisory Council and the Interagency Noise Advisory Committee will meet on Monday, May 17, 2004 from 9:00 to noon at the Department's headquarters, Aqua Conference Room, behind the reception desk in the lobby.

Directions can be found at our web site: www.mde.state.md.us.

The agenda is still being prepared, but we will have a presentation by Dr. Andrew Sawyers on Environmental Justice and noise. Dr. Sawyers works in the Secretary's Office on EJ and community planning issues.

Presentations from the public will be scheduled for 11:30 to 12:00.

Suggestions for agenda items for this and future meetings are requested.

The final agenda for May will be distributed one to two weeks prior to the meeting.

Regarding the status of the proposed changes to the regulations:

The public comment period has closed and the Department's responses are being considered by the Attorney General's office. If there are no significant changes, the proposed changes will be provided to the Secretary for approval, and they will then be scheduled for final publication in the Maryland Register. These steps could take six to eight weeks.

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<<<<GWIASIG 0.07>>>>

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98

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Date: 01/23/2004 4:01PM
Subject: Noise regulations

To all:

A copy of the proposed changes to the noise regulations is attached. The two Word attachments show the changes alone as they are being published in the Maryland Register, and secondly as they are incorporated in the full text. The full text version is an unofficial, and provided only as a guide.

Please see our web site: www.mde.state.md.us and search on noise if you have trouble opening the Word documents, or want to refer someone else to the proposed action.

We are required to have a formal public hearing to solicit comments. It is anticipated that our extensive open public discussion of the changes during the past year will minimize the comments that will be made at the public hearing. A copy of our web announcement is below.

Please do not hesitate to contact me if you have any questions.

Public Meeting Announcement

Proposed Changes to the Environmental Noise Control Regulations

The Maryland Department of the Environment's (MDE) Noise Control Program requires that a public hearing be held before any changes in the regulations are implemented. The Environmental Noise Advisory Council and the Interagency Noise Control Committee have met and discussed the proposed changes and recommended that the MDE proceed with their implementation.

A public hearing will be held on Monday, March 1, 2004 at 1800 Washington Boulevard from 6:00 until 8:00 PM. Any hearing impaired person may request an interpreter to be present at the meeting by giving five (5) working days notice to Deanna Miles-Brown, MDE Regulations Coordinator at (410) 537-3173. Comments or questions may be directed to Ms. Watson by phone at (410) 537-3906, or in writing to MDE, Technical and Regulatory Services Administration, 1800 Washington Blvd., Baltimore, MD 21230, or faxed to the attention of Ms. Watson at (410) 537-3873 on or before March 23, 2004.

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160

Title 26

DEPARTMENT OF THE ENVIRONMENT

**Subtitle 02 OCCUPATIONAL, INDUSTRIAL,
AND RESIDENTIAL HAZARDS**

Chapter 03 Control of Noise Pollution

Authority: Environment Article §3-401,
Annotated Code of Maryland

Proposed changes:

[deleted material in square brackets]
added material in italics

.01 Definitions.

A. - E. (text unchanged)

F. "Decibel (dB)" means a unit of measure equal to ten times the logarithm to the base ten of the ratio of [a particular sound pressure squared to a standard reference pressure squared]

the square of the sound pressure to the square of a standard reference pressure. For the purpose of this subtitle, 20 micropascals shall be the standard reference pressure.

G. - L. (text unchanged)

M. "IEC" means *International Electrotechnical Commission*.

[M] N. - [O] P. (text unchanged)

[P] Q. "Periodic noise" means noise possessing a repetitive on-and-off characteristic [.] *with a rapid rise to maximum and a short decay not exceeding 2 seconds.*

[Q] R. - [R] S. (text unchanged)

[S] T. "Sound level" means, in decibels, the weighted sound pressure level measured by the use of a sound level meter [satisfying the requirements of ANSI S1.4 1971 "Specifications for Sound Level Meters]. Sound level and noise level are synonymous. The weighting employed shall always be specified.

[T] U. "Sound level meter" means an instrument, meeting [ANSI S1.4 1971

“Specifications for Sound Level Meters].

International Electrotechnical Commission and National Standards Institute standards comprising a microphone, an amplifier, an output meter, and frequency-weighting network(s) that is used for the measurement of sound pressure levels in a specified manner.

[U] V. Sound Pressure.

(1) (text unchanged)

[(2) For a steady sound, the value of the sound pressure average over a period of time.]

[(3)] (2) (text unchanged)

[V] W. “Sound pressure level” means, in decibels, 20 times the logarithm to the base ten of the ratio of a sound pressure to the reference sound pressure of 20 micropascals (20 micronewtons per square meter). In the absence of any modifier, the [level] *pressure* is understood to be that of a root-mean square pressure.

[W] X - Y. (text unchanged)

[Y] Z. “Zoning district,” means a general land use category, defined according to local subdivision, the activities and uses for which are generally uniform throughout the subdivision. For the purposes of this regulation, property which is not zoned [“residential”, “commercial”, or “industrial”], “*industrial*”, “*commercial*”, or “*residential*” shall be classified according to use as follows:

[(1) “Commercial” means property used for buying and selling goods and services;

(2) “Industrial” means property used for manufacturing and storing goods;]

(1) “*Industrial*” means property used for manufacturing and storing goods;

(2) “*Commercial*” means property used for buying and selling goods and services;

(3) (text unchanged)

.03 General Regulations.

A. Noise and Vibration Prohibitions.

(1) – (4) (text unchanged)

(5) *A person may not operate or permit to be operated an off-road internal combustion engine powered recreational vehicle, including but not limited to, a dirt bike, an all terrain vehicle, a go cart, a snowmobile, or a similar vehicle on private property, closer than 300 feet to a neighboring residence or the associated curtilage,*

102

without the written permission of the affected resident, unless it can be demonstrated to the Department that the vehicle can be operated within the noise limits specified in Table 2 under §A(1) of this regulation.

B. Exemptions.

(1) The provisions of this regulation may not apply to devices used solely for the purpose of warning, protecting, or alerting the public, or some segment thereof, of the existence of an emergency or hazardous situation.

(2) The provisions of the regulation do not apply to the following:

(a) Household tools and portable appliances in normal usage [.] *during daytime house.*

(b) – (i) (text unchanged)

(j) Sound not electronically amplified created by sporting, amusement, and entertainment events and other public gatherings operating according to terms and conditions of the appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facilities, parades, and public celebrations. This exemption only applies between the hours of 7 a.m. and 12 midnight.]

(j) *Sound, except those sounds that are electronically amplified between 7 a.m. and midnight, created by:*

(i) *Sporting events (except trap shooting, skeet shooting, or other target shooting);*

(ii) *Entertainment events; and*

(iii) *Other public gatherings operating under permit or permission of the appropriate local jurisdiction.*

(k) – (m) (text unchanged)

(n) *Household pets on residential property that are maintained in accordance with local zoning requirements.*

(o) *Except in Allegany, Anne Arundel, Baltimore City, Calvert, Charles, Garrett, Howard, Montgomery, St. Mary's, and Washington Counties, trap shooting, skeet shooting, or other target shooting between the hours of 9 a.m. and 10 p.m. on any range or other property of a shooting sports club that is chartered and in operation as of January 1, 2001.*

(p) *Trash collection operations between the hours of 7 a.m. and 10 p.m.*

(3) *The events and gatherings under §B(2)(j) of this regulation includes, but are not limited to, athletic contests, amusement parks, carnivals, fairs at fairgrounds, sanctioned auto racing facilities, parades, and public celebrations.*

(4) *In Frederick County or Frederick City, a fair listed in the Maryland agricultural fairs and shows schedule that is maintained by the Maryland Agricultural Fair Board, or any other event held on the same grounds and listed by the Agricultural Fair Board, is exempt from this chapter.*

C. Variance Procedure.

(1) – (6) (text unchanged)

(7) Applicants shall be responsible for public hearing costs, as directed by the Department including the hearing advertisement, facility rental, court reporter, and preparation of the transcript of the hearing.

D. Measurement.

(1) The equipment and techniques employed in the measurement of noise levels may be those recommended by the department, which may, but need not, refer to currently accepted standards or recognized organizations, including, but not limited to, the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), Society of Automotive Engineers (SAE), *International Electrotechnical Commission (IEC)* and the United States Environmental Protection Agency (EPA).

(2) (text unchanged)

(3) Sound level meters used to determine compliance with Regulation .03 shall meet or exceed the specifications [of the American National Standards Institute or its successor bodies ANSI S1.4 1971] for Type II sound level meters.

DRAFT June 30, 2003

Summary of the draft changes to MDE's noise regulations

1. Define "periodic noise" to mean those sounds with discrete on and off characteristics. The intent and practice of the Department has been to impose a 5-decibel penalty on noises with sharp and well-defined repetitive characteristics because of their higher level of intolerance. The current definition is ambiguous in regard to the character of these sounds. The intent of the change is to clearly define those noises that would be subject to the tighter standards. The proposed definition is generally recognized in the literature.
2. Impose the tighter standard for either periodic noises (impulse noise) or discrete tones, rather than the current language, which could be implied to indicate that both needed to be occurring together. In essence, replace AND with OR.
3. Create a new performance based standard for dirt bikes and associated vehicles. Since it is almost impossible to measure a violation because of the usually sporadic nature of the noise and the ability of the source to stop operations upon the arrival of an inspector, it is considered highly desirable to create a standard that can be enforced without an actual noise measurement, and require the alleged offender to demonstrate compliance potential to the Department. Standard noise attenuation tables suggest that the proposed distance will result in compliance.
4. Provide for the exemption of sounds relating to emergency AND HAZARDOUS conditions. The current language only exempts emergency situations. OSHA warning devices on trucks and other machinery could be argued to be protective and not reach the level of an emergency that would justify the exemption, which is now being afforded to warning devices.
5. Household tools when operated in normal circumstances should be exempt. The change regarding this exemption is to specify that normal household tools are exempt only during daytime hours. On rare occasions, complaints have been received from the public relating outdoor tool use during the night. Emergency needs would continue to be allowed.
6. Changes were not made to the regulations concerning gun clubs when the statute was modified in 1983. Prior to that date, all gun clubs were regulated pursuant to a 1979 Attorney General's decision that included "sport shooting" in the definition of a sporting event. Following the 1983 change, and other subsequent changes, the legislature has affirmed that some gun clubs in certain counties after certain dates would be required to adhere to the standards. The proposed changes in the regulations are intended to conform to the intent of the statute. To accomplish this, gun clubs are being removed from the general exemptions for sporting events, and they are being placed in their own paragraph, which mirrors the statute.
7. Household pets (primarily barking dogs) often create nuisance situations. The Department wants to establish that household pets are not regulated at the state level. Complaints associated with these types of circumstances should be handled by the local jurisdictions through their animal control or police agencies. The Department will continue to provide assistance in complex situations when large numbers of pets are involved and zoning violations are occurring in residential situations, and in commercial kennel situations. The Department does not have the type of policing authority to handle these domestic situations.
8. Trash collections, especially commercial dumpster collections, almost always exceed noise standards if there is a residential situation within 200 feet. We are strongly encouraging

105

- collection companies to arrange for trash pick up during the day to avoid complaints. Therefore, it is necessary to provide an exemption for these activities during the daytime.
9. Requests for variances involve a number of formal procedures that can impose a modest cost to the Department. Advertisement costs are already the responsibility of the applicant and public facilities are usually acquired at minimal costs. Thus, the Department is proposing that the court reporter and transcript costs be assigned to the applicant. Costs would vary depending upon the scope of the variance request. Minor variance situations with limited witnesses and hearing time could result in costs of no more than a few hundred dollars.